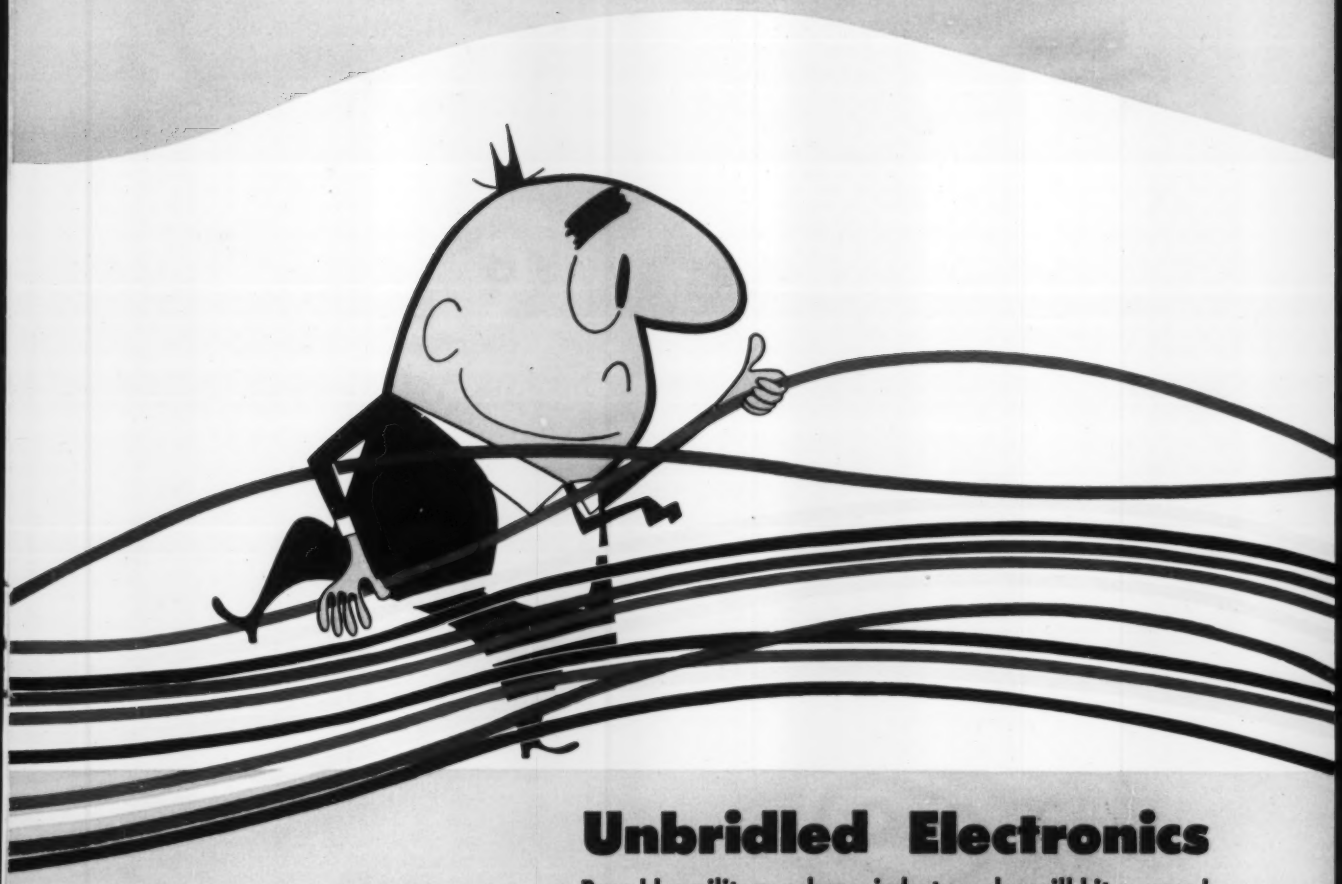
NOVEMBER 25, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



Unbridled Electronics

Paced by military volume, industry sales will hit a record $7.15 billion this year, $10.3 billion by 1960 . . . Page 60

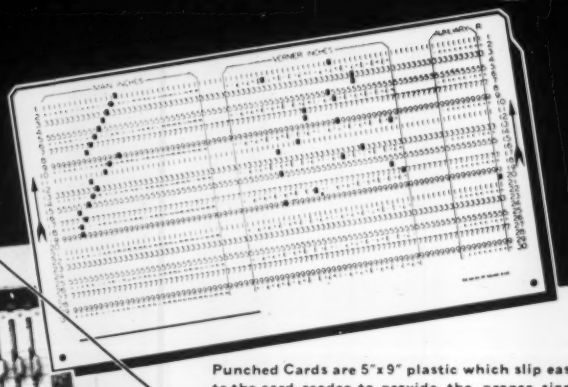
✔ Manhattan Project for Space . . . Page 59

✔ Atomic Reactors Get Good Weld . . . Page 92

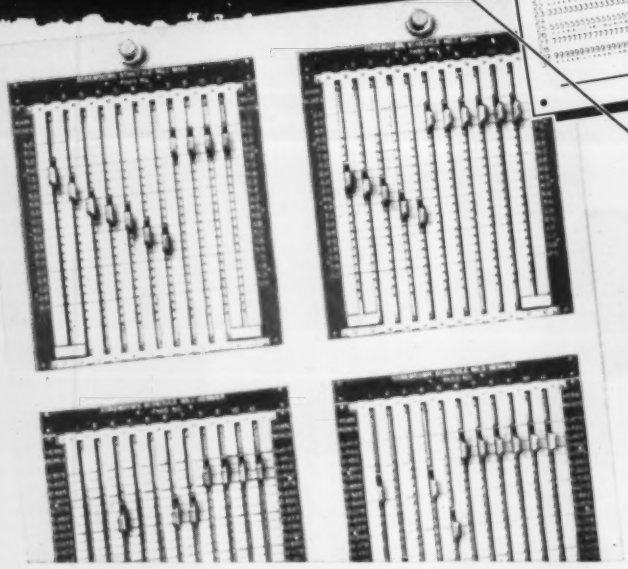
CONTENTS — PAGE 5

Your choice of Automatic rolling—

from EC&M PUNCHED CARDS...



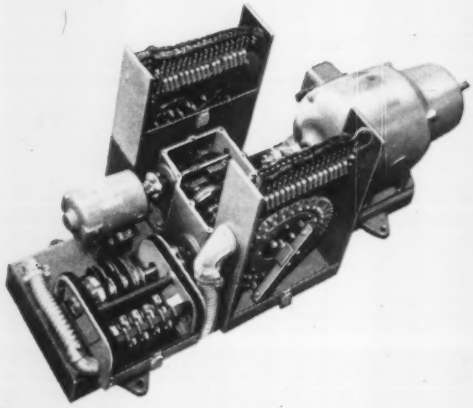
Punched Cards are 5"x9" plastic which slip easily into the card-reader to provide the proper signal for each pass. Indexing is automatic for the complete schedule.



Complete schedules are easy to set-up on EC&M Slider Contact Panels.

...or SLIDER CONTACT PANELS

The EC&M Automatic-Positioning Screwdown Control permits a mill to be operated at full capacity. This system of control has been operating successfully for 20 years, giving a high rate of production with products rolled to close tolerances. Nearly 50 installations use this EC&M Automatic Control.



EC&M Roll-Position Sensing Unit is simple and compact—controls roll movements from pulpit or control room—up to 1,600 settings per pass permits small increment roll-settings.

Rolling operations may be automatically programmed by either one of two EC&M methods — the Punched Card Method or Slider-Contact Panels. Both systems are direct reading for ease of set-up. Each is simple, and since there is no coding or de-coding requiring a multiplicity of relays, servicing may be done by a regular maintenance crew.

To learn how the EC&M Screwdown Control System may be applied to your rolling operations, write our nearby field office for a copy of new Bulletin 6550 describing the Punched Card and Slider-Contact Panel systems of automatic rolling.

Write for EC&M Bulletin 6550

THE ELECTRIC CONTROLLER & MFG. CO.

A DIVISION OF THE SQUARE D COMPANY

CLEVELAND 28 • OHIO

EC&M'S 60TH ANNIVERSARY (1897-1957)

9305

Owner: Nedmac Associates, Inc. *Architect:* Ziegler, Childs & Paulsen. *Structural Engineers:* Lars I. Moe & Son. *General Contractor:* Terminal Construction Corporation.

3,500 Tons Erected in Five Weeks With High-Strength Bolting

This is the new Parkade Building, a modern functional structure in the center of Camden, N. J. The wings and first and second floors of the center portion of the building are used for office space, while the top three floors of the center portion, plus the entire roof, are devoted to parking facilities for 1000 cars. Bethlehem High-Strength Bolts were used in joining the structural members of the 3500-ton steel framework, which was erected in less than five weeks.

Bethlehem High-Strength Bolts make possible a saving in time in erecting steelwork because they are so easy to install. Only two pieces of equipment—a holding wrench and a pneumatic impact wrench—are needed to make joints which are permanently tight.

In addition to the time-saving factor, high-strength bolting is a particularly good choice for construction in hospital and school zones, as the pneumatic wrench used for tightening is far less noisy than a riveting gun. Besides, there's no fire hazard involved, as the bolts are installed cold. Nor is there danger of injury from tossed rivets.

Bethlehem High-Strength Bolts are made of carbon steel. They are heat-treated by quenching and tempering, and meet the requirements of ASTM Specification A-325.

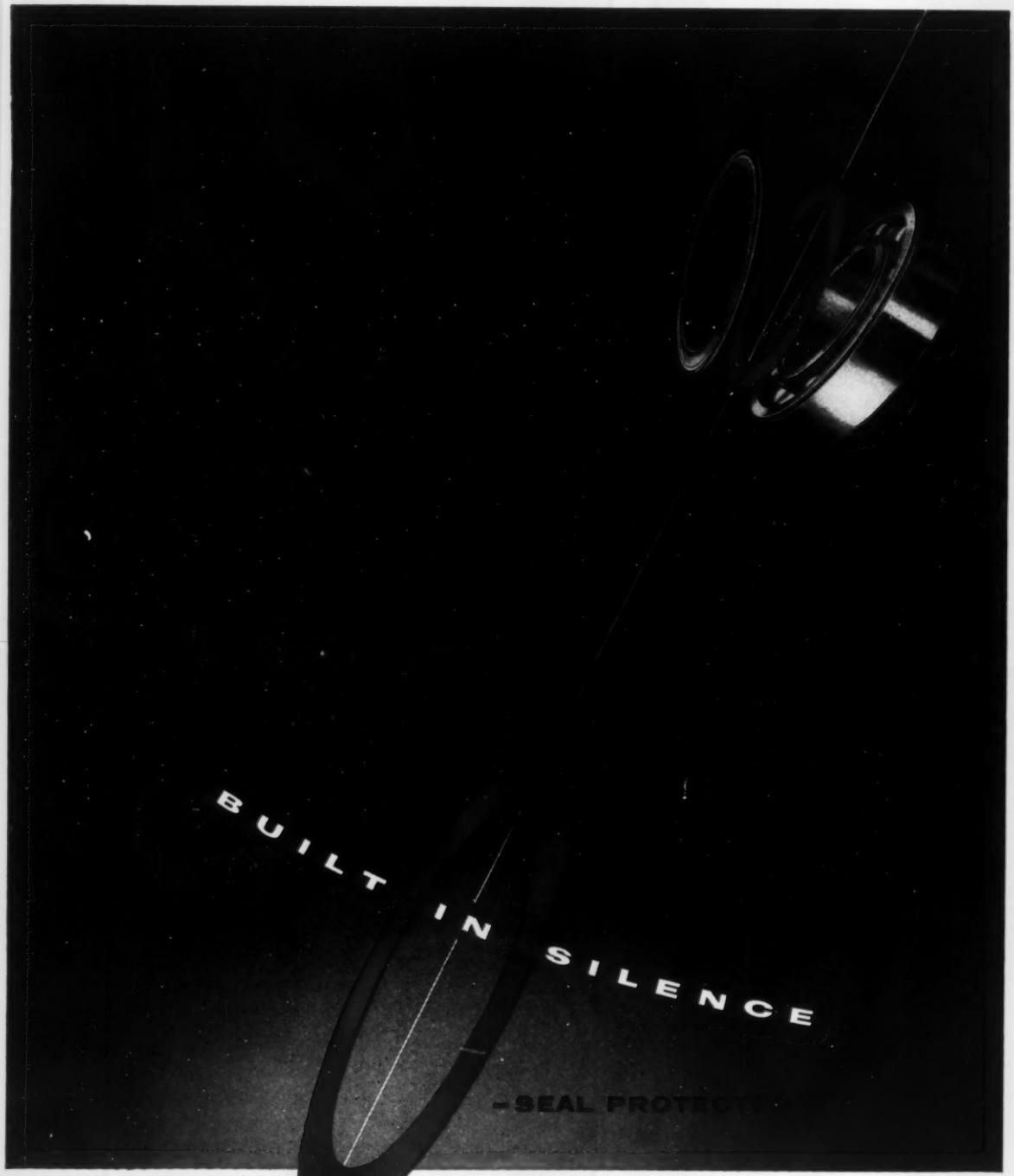
If you would like a copy of our illustrated booklet on high-strength bolting, all you need do is get in touch with the nearest Bethlehem sales office. Or write to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL



EVERY TYPE—EVERY USE

SKF®

- *Ball Bearings*
- *Cylindrical Roller Bearings*
- *Spherical Roller Bearings*
- *Tapered Roller Bearings* (Tyson®)

7762

® Reg. U.S. Pat. Off. Tyson Bearing Corporation

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

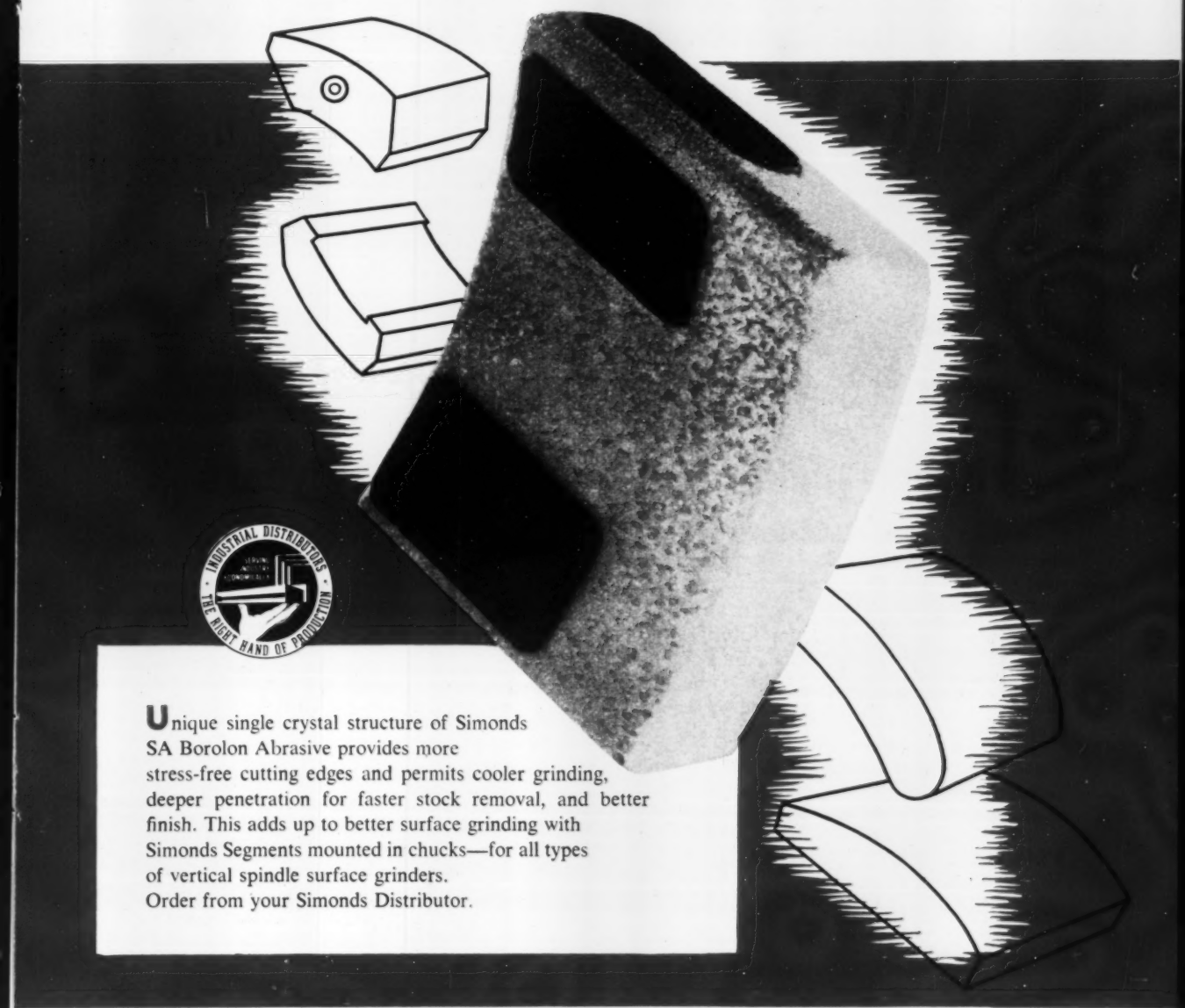
The most silent rolling contact bearing in the world of today

Now!

SIMONDS ABRASIVE CO.

abrasive segments

with SA Borolon® TRADE MARK . . . for faster cooler grinding . . .



INDUSTRIAL DISTRIBUTORS · THE RIGHT HAND OF PRODUCTION ·

Unique single crystal structure of Simonds SA Borolon Abrasive provides more stress-free cutting edges and permits cooler grinding, deeper penetration for faster stock removal, and better finish. This adds up to better surface grinding with Simonds Segments mounted in chucks—for all types of vertical spindle surface grinders. Order from your Simonds Distributor.

SIMONDS ABRASIVE COMPANY

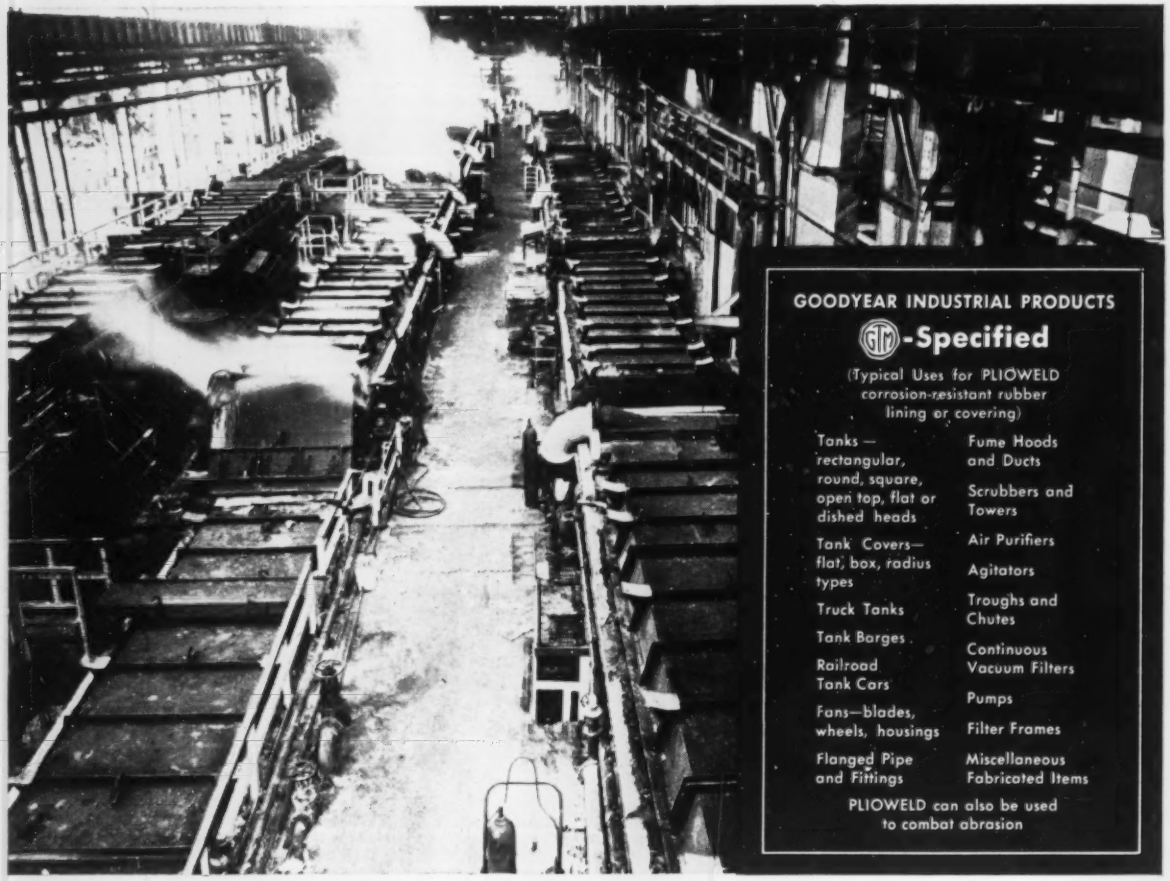
Tacony & Fraley Sts., Philadelphia 37, Pa.

Division of Simonds Saw and Steel Co.

BRANCHES: PHILADELPHIA • CHICAGO • DETROIT • SHREVEPORT • LOS ANGELES SAN FRANCISCO • PORTLAND, ORE.

CALL
YOUR SIMONDS DISTRIBUTOR

Proven products
Dependable know-how
Quick supply



GOODYEAR INDUSTRIAL PRODUCTS

G.T.M.-Specified

(Typical Uses for PLIOWELD corrosion-resistant rubber lining or covering)

- Tanks — rectangular, round, square, open top, flat or dished heads
- Tank Covers — flat, box, radius types
- Truck Tanks
- Tank Barges
- Railroad Tank Cars
- Fans — blades, wheels, housings
- Flanged Pipe and Fittings
- Fume Hoods and Ducts
- Scrubbers and Towers
- Air Purifiers
- Agitators
- Troughs and Chutes
- Continuous Vacuum Filters
- Pumps
- Filter Frames
- Miscellaneous Fabricated Items

PLIOWELD can also be used to combat abrasion

Keeps pickle line perking for 17 years

Keeping a giant-size pickling line in steady production is no little trick. Especially in a big-name steel mill like this one—turning out millions of tons a year.

Their 25% sulphuric pickling solution wages constant acid attack on whatever equipment used. And the above-average 225°F. operating temperatures are especially hard on rubber—preferred linings for most pickling tanks.

Right from the beginning, the G.T.M.—Goodyear Technical Man—saw these tough conditions as a good spot for PLIOWELD—the acid- and abrasion-resistant rubber by Goodyear. How right was he? At last report, the PLIOWELD tank linings *had given 17 straight years of more-than-satisfactory service—still looked good for many more.*

That's no rare case, either. Wherever the G.T.M. tackles a problem—and solves it with a super-quality Goodyear product like PLIOWELD linings—you can count on exceptional service. Give him a try by contacting your Goodyear Distributor—or writing:

Goodyear, Industrial Products Division,
Akron 16, Ohio.

PLIOWELD TANK LININGS by

GOODYEAR

THE GREATEST NAME IN RUBBER

Plioweld—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

IN THIS ISSUE

STEEL The Metalworking Weekly

November 25, 1957
Vol. 141 No. 22

METALWORKING OUTLOOK

53 **Congress works up steam on defense plans**—Most congressmen urge moderation, but a few advocate fast spending

EDITORIAL

57 **The left hand knoweth not!**

☑ 59 **Manhattan project for space**—Program to develop superweapons may be most important of all postsputnik developments

COVER ARTICLE

60 **Unbridled electronics**—Paced by military volume, industry sales will hit a record $7.15 billion this year, $10.3 billion by 1960

62 **Aircraft springs expand**—Makers benefit from all-out missile efforts

☑ 63 **Big job for the missile vender**—AC Spark Plug's Martin Caserio discusses the potentials

64 **How AC Spark Plug makes missile parts**

69 **"Fair prices" for electrical equipment are a must,** producers told

70 **Weirton stockpiles skills** to build strong management organization

71 **Trend to sintering grows**—Equipment makers see long term sales growth

87 **Hardinge turns huge drum**—One of largest ever machined on lathe

TECHNICAL OUTLOOK

91 **Stream degassing process reduces hydrogen content** in alloy steel forgings to less than 1.5 ppm, increases ductility

☑ 92 **Atomic reactors get top-grade welds**—Checklists may aid in your work

94 **How fast can you machine heat treated steels?**—Here are some tips

96 **Investment caster uses vacuum**—It's production line operation at Austenal

98 **Clue to stronger steel**—GE turns it up in fundamental research project

100 **Progress in steelmaking**—Automatic marking gains favor

103 **Pickling stainless to remove scale**—Right method must be picked for job

☑ 110 **How to give powdered metals strength**—Fill pores with a second metal

MARKET OUTLOOK

127 **Steel consumers still cutting into inventories**—Indexes and composites, 137; steel prices, 139; ores, 147; ferroalloys, 148; scrap trends, 151, prices, 152

☑ 129 **Construction is a good steel customer**—This industry took up much of slack in steel buying in first three quarters of 1957

154 **Nonferrous metals**—Merger plans announced—Prices, 156

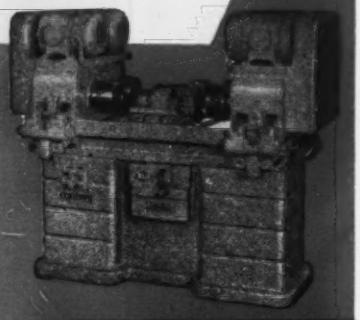
REGULAR FEATURES

6 Behind the Scenes
10 Letters to the Editors
16 Staff
23 Calendar of Meetings
66 Windows of Washington
73 Mirrors of Motordom
77 The Business Trend
81 Men of Industry
84 Obituaries
117 New Products
124 New Literature
159 Advertising Index

Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Subscriptions in the U. S. and possessions and Canada, $10 a year; all other countries, $20. Current issues, 50 cents each. Metalworking Yearbook issue, $2. Accepted as controlled circulation publication at Cleveland. Copyright, 1957, The Penton Publishing Co.

Index available semiannually. STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

MAXIMUM PRODUCTION AT LOW COST!



This Ex-Cell-O Style 1212-B Double-End Boring Machine practically *doubles production* when loading time of parts approximates the time of machining.

Precision and versatility are built into every Ex-Cell-O Boring Machine—the minute you put one to work your profits go up! All standard models are easily equipped for automatic production at minimum cost.

● **STYLE 2112-B SINGLE-END:** For work pieces in the small and medium-size range. Flexible hydraulic controls give easy adjustment of work cycle.

● **STYLE 112-D:** With long stroke for medium and heavy work requiring precision production.

● **STYLE 17-A:** Massive construction to maintain highest precision at production speed. Economical and easily tooled for a wide range of jobs.

XLO *EX-CELL-O FOR PRECISION*

57-42

EX-CELL-O CORPORATION DETROIT 32, MICHIGAN

behind the scenes

Electronic Squeeze

The stretch of years between Thothmes IV and George Washington comes to about 3229, yet when those boys rode to their respective inaugurals in Thebes and New York, they traveled in wooden-wheeled vehicles drawn by horses. We bring this up to suggest that, beyond superficial things, the world hadn't changed a great deal between 1440 B.C. and 1789 A.D.

The stretch between the presentation of a paper by Sir William Crookes in 1900 and the devastation of Hiroshima is only 45 years—but in that short time the world has changed beyond recognition and beyond recall. At the turn of the century, Sir William stirred great merriment in scientific circles by declaring: 1. That electrons were the ultimate particles of which the atoms of matter are composed. 2. That they were systems of considerable complexity (Sir William died in 1919, so he never learned how right he was). 3. That they should be considered a "fourth state" of matter, called "radiant matter."

Perhaps Thothmes, George Washington, and everybody else who ever walked the earth were lucky up to the time Sir William got to fooling around with electrons. Now we're all stuck with them—particularly companies caught in the expansion of the electronics industry. This field is ideally suited to small firms, but they're having trouble keeping up with expansion requirements. STEEL's story about their predicament (Page 59) will bring you up to date on why mergers are common in the electronics industry; why business failures are frequent; and what the shift to missiles has done to its subcontractors.

Spare That Price

The frightening phenomenon of price cutting has reached down into Virginia, even unto the Virginia Smelting Co. of West Norfolk. Rollin H. Israel, manager of the Refrigeration Sales Dept. thereof, confessed to Editor-in-Chief Irwin Such that the refrigeration industry is suffering from an acute attack of price cutting. Mr. Israel called Mr. Such's attention to an editorial "Why Not a Profit?" which appeared in the Oct. 21 STEEL and was kind enough to congratulate him on his unerring diagnosis of an unfortunate situation.

"I thought you might be interested," wrote Mr. Israel, "in the little gimmick we have prepared which points the finger at price cutting." The gimmick, which he enclosed for the editor's consideration, was a first-aid card kit for cuts, about the size of a calling card. Attached to it was a Band Aid and a tiny Merthiolate applicator. The back of the card bore this message: "First aid for all injuries—EXCEPT PRICE CUTS!"

Triangles and Geography

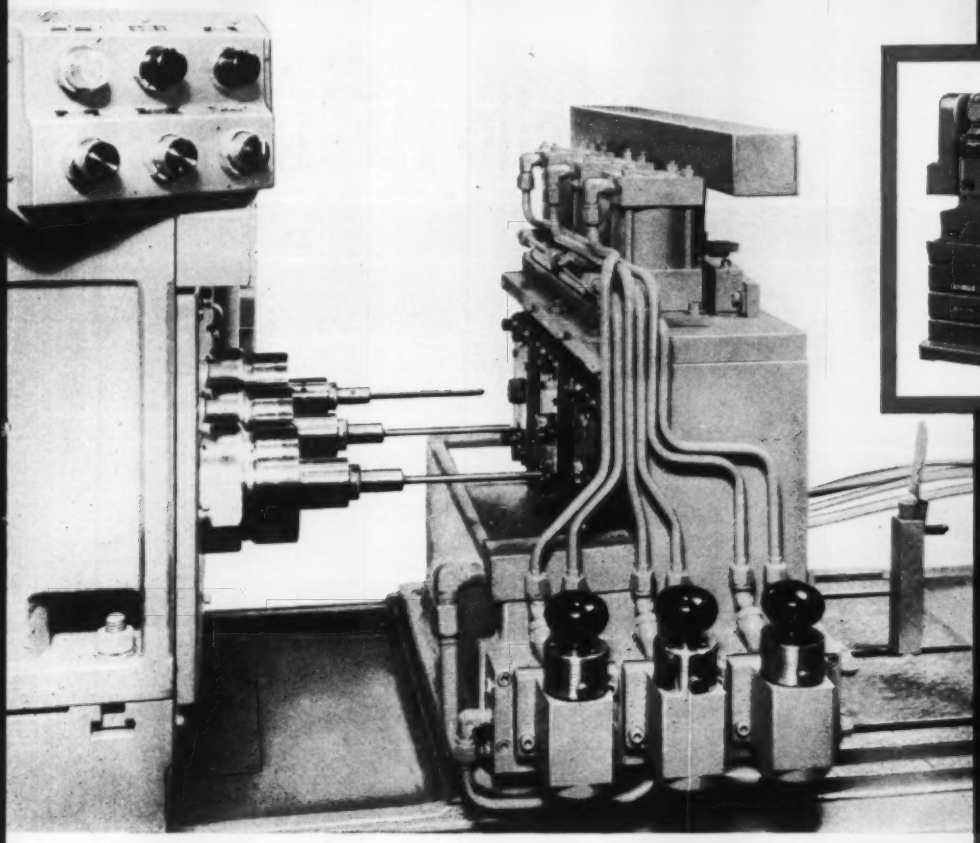
Say, hey! It's about time to mention some of the persons who were amiable enough to comment on our puzzles: James R. Cookson, a melter at the Republic Steel plant in Massillon, Ohio; C. G. Lohmann, Hart-Cooley Mfg., Holland, Mich.; Doris A. Smith, International Rack Co., Springfield, Ohio; Charlsie and Letterman and Berry, General Steel Castings Corp., Granite City, Ill.; Norman W. Scherer, Klotz Machine Co., Sandusky, Ohio; L. F. Wilson, Harbison-Walker Refractories Co., Buffalo; Janice Owens, Dresser Industries Inc., Bradford, Pa.; F. E. Martin, David Bradley Mfg. Works, Bradley, Ill. The heads, of course, were 5-8-16, total 29, and Sputnik's license plate was 10968.)

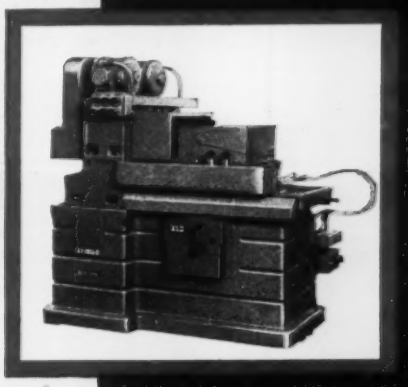
We have no apology to offer for the fact that most of these puzzles are as old and moth-eaten as Shrdlu himself, but they're fun. So take eight matches, and make yourself four equal triangles with them. (In this instance, experience has shown that a lighter cannot be substituted for matches, because it makes the trick more difficult.)

Incidentally, this is Know-Your-America Week. Can you quickly locate the Dinosaur National Monument, Craters of the Moon, Bull Shoals, and the Boston Mountains?

Shrdlu

(Metalworking Outlook—Page 53)





A standard Style 112-D Precision Boring Machine equipped for Bor-Dril work.

Bor-Drilling on a standard 112-D Precision Boring Machine. This three-station set-up produces close-tolerance holes, smooth finish.

BOR-DRIL

PRODUCES .312-.313 DIAMETER PRECISION THROUGH HOLES IN 2½" SOLID METAL

Bor-Drilling turns out straight, accurate holes—such as these held to .312"-.313" diameter for 2½ inches.

THE PROBLEM: an auto manufacturer wanted to produce accurate, close-tolerance holes from the solid in small transmission parts without costly secondary operations.

THE SOLUTION: Ex-Cell-O Style 112-D Precision Boring Machines equipped for Bor-Drilling. These machines are Bor-Drilling .312"-.313" diameter through holes for a distance of 2½", three at a time in transmission range selector shaft.

WHAT IS BOR-DRILLING? Bor-Dril is a new way of driving gun drills, adapted to high production-with-accuracy requirements. Bor-Drilling is especially effective when machining from the solid holes too long for single-tool boring applications, and holes in which it is difficult to maintain finish size. Bor-Drilling requires no secondary finishing operations in most cases. Ask your Ex-Cell-O Representative or write Ex-Cell-O, Detroit for Bulletin 311162 explaining all about Bor-Drilling.

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN
Machinery Division

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • TORQUE ACTUATORS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

XLO
EX-CELL-O FOR PRECISION

Republic ELECTRUNITE

WHEN IT'S MOVING, MAKE IT TUBING . . . a Republic engineering principle that improves sales and profits for manufacturers. This simple 2½-inch bearing liner made of Republic ELECTRUNITE Stainless Steel Tubing is featured in the new "Highlander" Automatic Washer developed by the Maytag Company to meet the needs and requests of budget-conscious young Americans.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

Stainless Steel Tubing... helps MAYTAG bid for Big Volume Sales

Engineering innovations such as this switch to Republic ELECTRUNITE® Stainless Steel Tubing made it possible for the Maytag Company to produce its new "Highlander". This automatic washer is priced to meet the needs and demands of budget-conscious young Americans without sacrificing quality found in top-of-the-line models.

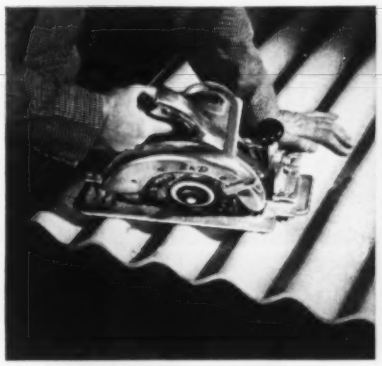
It's a simple 2½-inch bearing liner. But, it saves Maytag money.

Republic ELECTRUNITE Stainless Steel Tubing provides greater true concentricity than the tubing formerly used. There is no need for buying a heavier wall and then spending more money to remove stock.

Tubing originally purchased was .187″ wall thickness. By utilizing the concentricity of ELECTRUNITE they were able to reduce the wall to .083″.

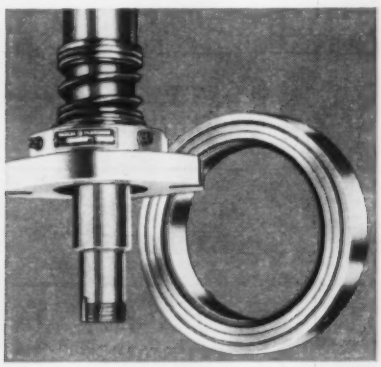
And, they get the rust-and-corrosion-resistance that only stainless steel can offer. This is vital because the tube becomes the outer shell of the main agitator bearing. It must operate for the *life of the washer* with no further lubrication than originally supplied.

Welded stainless steel tubing can save you money and hold quality high. Especially when it's ELECTRUNITE—uniformly round, uniform in wall thickness, free from defects, resistant to rust and corrosion, easily fabricated, strong, tough. And, produced by Steel and Tubes—the pioneer in electrically welded tubing. Let us show you where it can cut costs, improve quality in your products, processes and plants. Write for additional information today.



HEAVY-DUTY PERFORMANCE and reliability have played a major part in establishing product reputation for The Black & Decker Manufacturing Company, Towson, Maryland. Strong, long-lasting gears made from Republic Cold Finished Alloy Steel meet the heavy duty service requirements in this Black & Decker portable electric saw. And exceptionally high strength-to-weight ratio permits design of thinner sections to save weight and hold down size without sacrifice of strength. These are but a few advantages Republic Cold Finished Alloy Steel may offer you in your operations. For complete details write today.

REPUBLIC ELECTRO PAINTLOK, used for these water cooler housings, or for exterior panels of ranges, freezers, dryers, washers, air-conditioners and other major appliances and cabinets for home, commercial and industrial applications, provide an excellent paint-gripping surface for greater finish economy. Produced by electro-galvanizing and a chemical treatment process, Electro Paintlok Sheets are shipped from the mill in prime condition for painting. Even if final finish is scratched through, this coating limits corrosion to the point of damage. For additional data and complete details, send coupon.



REPUBLIC ENDURO® STAINLESS STEEL BARS develop a machine finish that looks as good as a ground finish—is the performance report from machine operators at Sealol Corporation, Providence, Rhode Island. This company used Free-Machining ENDURO bars in the manufacture of mechanical shaft seals for applications on fuel tankers, and in the food, chemical, aircraft and petroleum industries. Sealol machine operators like the machinability of ENDURO Stainless Steel Bars—the fine surface finish, the accuracy of section, the uniform soundness, and the ability of ENDURO to hold close tolerances. Send coupon today.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. C-4634
3120 EAST 45TH STREET • CLEVELAND 27, OHIO

Please send additional information for the following:

- ☐ Republic ELECTRUNITE Stainless Steel Tubing
- ☐ Republic Cold Finished Alloy Steel
- ☐ Republic Electro Paintlok
- ☐ Republic ENDURO Stainless Steel

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

On which of these can you use help?	OK here	Can use help
PRODUCT DESIGN & DEVELOPMENT		
MANUFACTURING COST ANALYSIS		
PRODUCTION PROCESSING		
TOOL & DIE DESIGN		
MACHINE DESIGN		
TIME STUDIES AND ANALYSIS		
AUTOMATION DEVELOPMENT		
PLANT LAYOUT & SPECIFICATIONS		
PRODUCTION & QUALITY CONTROL		

Handy Check List for Executives and Chief Engineers

If you have a single check in the "can use help" column, you need the services of Pioneer Engineering & Mfg. Co. Our complete, contract engineering services are available when and where you need them. For more information, contact our chief engineer. He'll see that you get it immediately.

SINCE 1931 **Pioneer ENGINEERING & MANUFACTURING CO., INC.**
Telephone - TWinbrook 3-4500
19669 John R Street, Detroit 3, Michigan

INDUSTRIAL ENGINEERS, CONSULTANTS & DESIGNERS
BRANCH OFFICES IN DAYTON, OHIO, WASHINGTON, D. C. and TORONTO, ONT., CAN.

LETTERS TO THE EDITORS

Condensation Applauded

We would appreciate three copies of your 16-page article, "Stainless Steels" (Nov. 4, Page 107). You are to be complimented for condensing this tremendous subject in relatively few pages.

Martin F. Braun
General Purchasing Agent
Hell Co.
Milwaukee

We wish to compliment you on a splendid job. We would appreciate three copies for use in our plant.

Robert A. Johnson Jr.
President
Westfield Metal Products Co. Inc.
Westfield, Mass.

May I have a copy? It is most interesting and informative.

W. N. Merchant
Staff Assistant to
Director of Works Accounting
Jones & Laughlin Steel Corp.
Pittsburgh

Impressed by Editorial

We were favorably impressed with the Nov. 4 editorial, "Don't Run for the Hills!" (Page 63). We would like 35 copies for distribution to our various branches and division managers.

J. A. Lane
Assistant to Vice President
Wheeling Corrugating Co.
Wheeling, W. Va.

Way To Make Money

Kindly send me six copies of the article, "Job Rating: Profit Saver" (Oct. 28, Page 121). I found it interesting and would like to distribute copies to our plant managers.

F. A. Smith
Vice President
Houdaille Industries Inc.
Buffalo

Stops STEEL Surgery

Your note about extra copies caught my eye just as I was about to amputate the 1957 Metal Selector (Oct. 28, Page 169) from our circulation copy of your wonderful magazine.

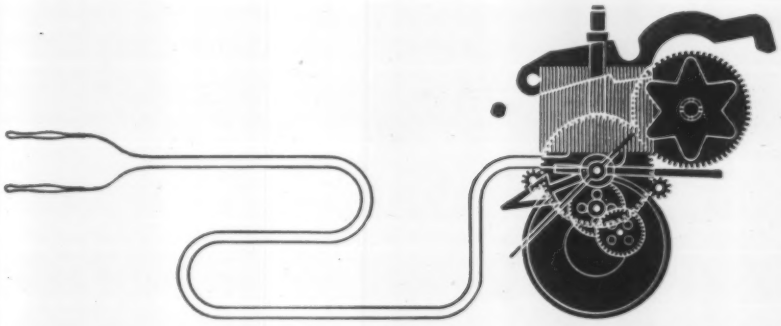
Will you please send me a free copy and be sure it is addressed to my personal attention.

R. Dawes
Chief Estimator
Peacock Bros. Ltd.
Montreal, Que.

Story to NAPA Members

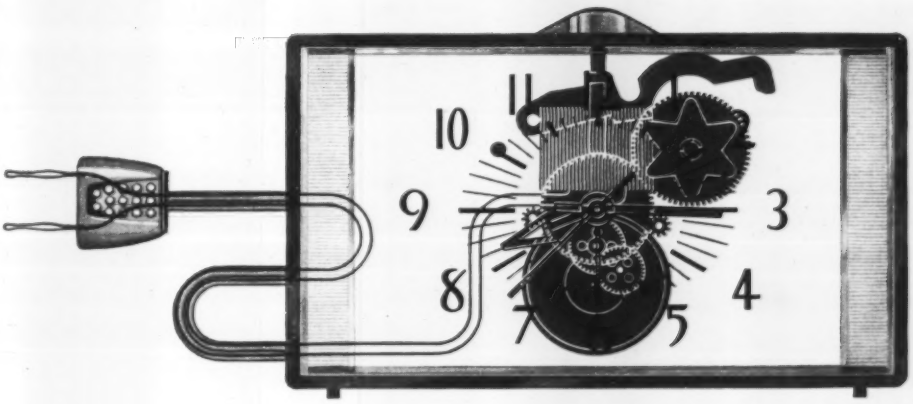
We are interested in securing 700 copies of the Program for Management article, "Make or Buy?" (Oct. 14, Page 105), for distribution to the officers of our affiliated associations. The material will be used for discussion or other

(Please turn to Page 12)



A modern electric clock by General Electric Company, Clock and Timer Department.

Add COPPER



. . . to keep America on time!

Almost any clock requires Copper to run accurately. For one thing, Brass (an alloy of Copper) can be precision-machined so that gear trains will move at a more accurate rate.

An *electric* clock needs Copper even more.

What other metal could provide Copper's high conductivity? What else could give you 6500 turns of wire in a tiny coil? What else makes delicate springs so durable? What other metal resists corrosion like Copper . . . *indefinitely?*

In a clock, parts made of Copper render service that is timeless.

And you find Copper easier to work. It draws readily to make a case or housing. It swages well to seal oil in a motor. It machines accurately for a high-load bearing. And the higher-cash-value of your manufacturing scrap lessens your raw materials cost.

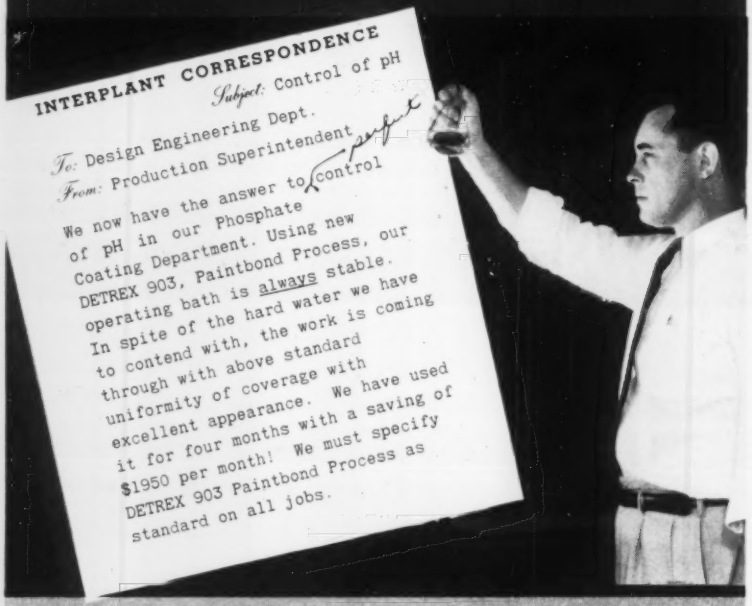
The Copper Industry will provide ample future supplies to enable you to design with Copper!

COPPER • BRASS • BRONZE

in over 40 Standard Alloys!

For information on the above or any other application of Copper, write to the Copper & Brass Research Association, 420 Lexington Ave., New York 17, N. Y.

MEMO TO MANAGEMENT


INTERPLANT CORRESPONDENCE
Subject: Control of pH
To: Design Engineering Dept.
From: Production Superintendent
We now have the answer to control of pH in our Phosphate Coating Department. Using new DETREX 903, Paintbond Process, our operating bath is always stable. In spite of the hard water we have to contend with, the work is coming through with above standard uniformity of coverage with excellent appearance. We have used it for four months with a saving of $1950 per month! We must specify DETREX 903 Paintbond Process as standard on all jobs.

New DETREX Iron Phosphate coating assures constant stability in operating bath

For the first time, iron phosphate finishing operations are assured of maximum efficiency and high-quality finishes *even in extreme hard water areas.* New DETREX 903, Paintbond Process, maintains pH stability at the level needed for uniform appearance and coverage. New DETREX 903 also provides a much heavier mg. coating weight per square foot, even in production line processing.

Besides providing excellent cleaning and a quality finish, DETREX Paintbond 903 has demonstrated remarkable resistance to corrosion in accelerated salt spray and humidity tests. All of these features combine to provide longer bath life, increased production and lower maintenance costs for the widest range of iron phosphate coating operations.

DETREX 903 is just one more example of DETREX progress in *all* phases of metal cleaning and processing. Such progress has made DETREX, pioneer in the field, now the recognized leader.

DETREX CHEMICAL INDUSTRIES, INC.

BOX 501, DEPT. A-801, DETROIT 23, MICH.

LETTERS

(Concluded from Page 10)

presentation to members at their December meetings.

G. W. H. Ahl
Executive Secretary-Treasurer
National Association of Purchasing Agents
New York

Your article has created considerable interest. We would like 25 copies.

Elizabeth Barrett
Staff Librarian
Thompson Products Inc.
Cleveland

Good Usage Promised

We could make good use of five copies of the article, "Figures Talk to Warehousers" (Oct. 21, Page 48).

R. M. Braga
Controller
Joseph T. Ryerson & Son Inc.
Chicago

Missile Story: Top Coverage

The article, "Missiles in Quantity Soon?" (Oct. 7, Page 119), is the best we have read in any technical magazine. The Missile Scoreboard is excellent, considering security limitations. We could use several copies.

W. H. Johnson
Technical Director
Quality Evaluation Laboratory
U. S. Naval Ammunition Depot Bangor
Bremerton, Wash.

Copies to Executive

Your article, "How To Be a Better Boss" (Sept. 23, Page 90), was of such interest to our executives that the head of the can division of the United Can & Glass Co. has asked me to circulate copies throughout our companies. May we have five reprints?

C. W. Blodgett
Hunt Foods & Industries Inc.
Hayward, Calif.

May I please have six reprints for use in our management development program.

John Lafferty
Manager
Cost Dept.
Hobart Mfg. Co.
Troy, Ohio

Excellent Handbook

Your 1957 Program for Management articles are looked forward to each month. They make an excellent handbook for the management of any firm. Would you please send a copy of No. 4, "Inventory Management" (May 13, Page 109)? My copy has disappeared.

J. D. Sowles
Office Manager
Framingham Welding & Engineering Corp.
Framingham, Mass.

Company To Reprint Chart

Please send 25 reprints of your excellent article, "Stainless Steel" (Nov. 4, Page 107). I would also like your permission to use the chart showing stainless steel producers in our company house organ.

A. Fred Limberg
Staff Assistant-Public Relations
Universal-Cyclops Steel Corp.
Bridgeville, Pa.

• *Permission granted.*

I have found your article instructive and educational. Please mail a reprint.

Michael A. Matz
Assistant Quality Control
Pittsburgh Works Div.
Jones & Laughlin Steel Corp.
Pittsburgh

HEYL & PATTERSON Rotary R. R. Car Dumper

one ... man
... spotting
... minute

and your railroad car is completely unloaded and contents weighed

View of the Dumper at Buffington, Indiana Plant, Universal Atlas Cement Company.

- Dumper is designed to rotate, dump and return to initial position in just one minute.
- Rotation can be stopped instantly at any position with car and platen firmly held in place.
- External and movable counterweights have been eliminated.
- Platen-mounted electronic scale is simple, accurate and economical.
- Car retarder on dumper permits economical and safe car spotting by dumper operator.

To achieve the most economical car weighing and dumping operation, the H & P Rotary Car Dumper can be equipped with a car retarder or an electronic scale, or both. This H & P electronic scale platen (Patent Pending) uses load cells which permit instant weighing and light-weighing of car in compliance with National Bureau of Standards acceptance tolerance, and printing of weigh tickets. Exceptional accuracy and trouble-free operation are assured due to absence of wearing parts.

By all standards, the H & P Rotary Dumper is the most efficient method of unloading large quantities of bulk materials from open-top railroad cars.

Even if you receive only a relatively small number of cars per day, may we suggest that you investigate the economics of the H & P Rotary Railroad Car Dumper.

MAIL COUPON TODAY FOR NEW DUMPER BROCHURE 957

HEYL & PATTERSON, INC., 55 Fort Pitt Blvd., Pittsburgh 22, Pa.

Please send me my copy of the H & P Dumper Brochure 957.

Name _____ Title _____

Company _____

Address _____

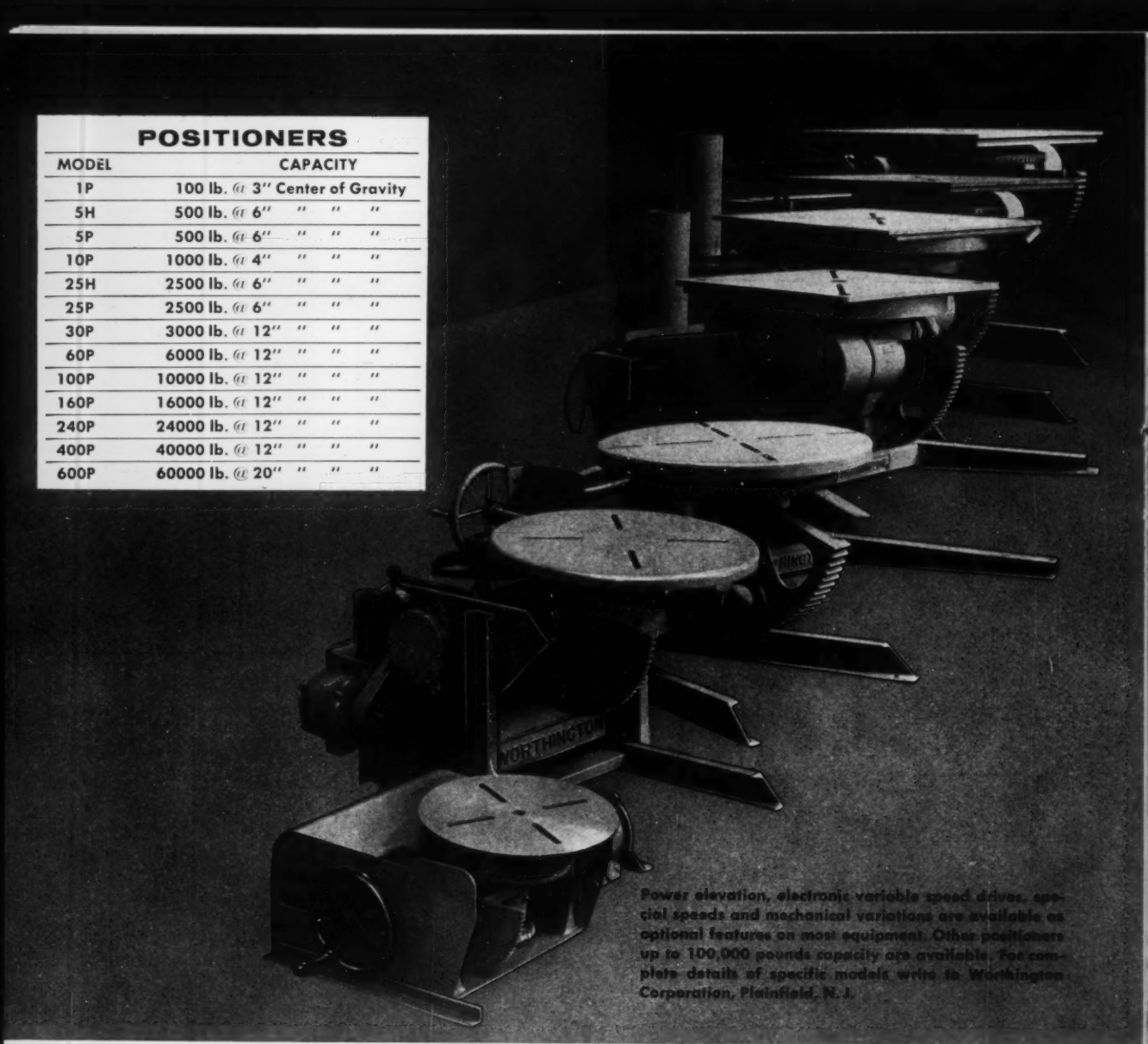
City and State _____

70 YEARS OF SERVICE

Heyl & Patterson

POSITIONERS

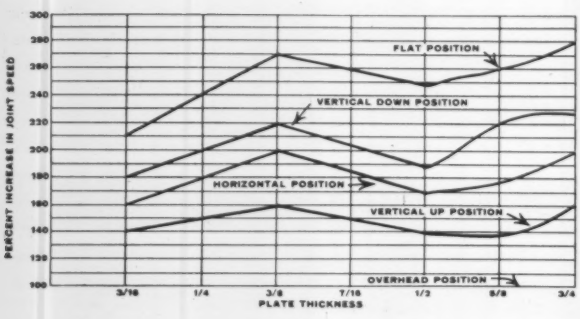
MODEL	CAPACITY
1P	100 lb. @ 3" Center of Gravity
5H	500 lb. @ 6" " " "
5P	500 lb. @ 6" " " "
10P	1000 lb. @ 4" " " "
25H	2500 lb. @ 6" " " "
25P	2500 lb. @ 6" " " "
30P	3000 lb. @ 12" " " "
60P	6000 lb. @ 12" " " "
100P	10000 lb. @ 12" " " "
160P	16000 lb. @ 12" " " "
240P	24000 lb. @ 12" " " "
400P	40000 lb. @ 12" " " "
600P	60000 lb. @ 20" " " "



Power elevation, electronic variable speed drives, special speeds and mechanical variations are available as optional features on most equipment. Other positioners up to 100,000 pounds capacity are available. For complete details of specific models write to Worthington Corporation, Plainfield, N.J.

INCREASE WELDING

with positioning equipment from



With a positioner you can often drastically reduce the cost of welding and work handling operations.

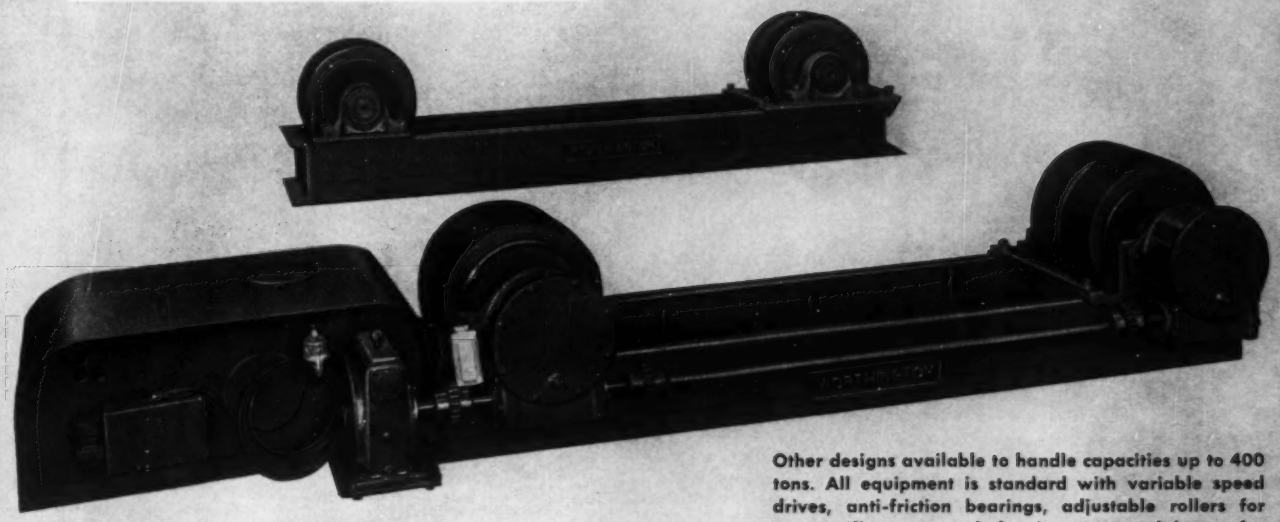
As the chart shows, joint speed in the downhand position is up to 280% faster than the other positions. With a positioner you always weld "downhand." Without a positioner it often takes more time and labor to handle the weldment than it does to actually weld the piece.

WHY WORTHINGTON?

There are many reasons why more welding is done on Worthington positioners than all others combined. One is

TURNING ROLLS

MODEL	TURNING CAPACITY		WEIGHT CAPACITY PER UNIT	
	METAL ROLLERS	RUBBER ROLLERS	METAL ROLLERS	RUBBER ROLLERS
A	9 tons	6 tons	3½ tons	2 tons
AA	10 tons	10 tons	5 tons	3⅓ tons
B	50 tons	30 tons	12½ tons	10 tons
C	100 tons	60 tons	20 tons	20 tons
D	180 tons	90 tons	30 tons	30 tons



Other designs available to handle capacities up to 400 tons. All equipment is standard with variable speed drives, anti-friction bearings, adjustable rollers for varying diameters, and electric remote push button for forward and reverse rotation. Optional features include tachometer and electric remote variable speed control.

Worthington turning rolls are also available in self-propelled models offering power driven and idler cars for power and idler rolls. For complete specifications write to Worthington Corporation, Plainfield, N.J.

SPEED UP TO 280%

Worthington's complete line

good service. With distributors in all principal cities a Worthington positioning specialist is nearby to help solve your welding problems.

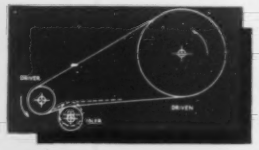
Conservative ratings are another. Worthington engineers its positioners to deliver year after year the rating stamped on the nameplate. And Worthington brings the industry's broadest background of experience and know-how to bear on your positioning problems. Conceived in the fabricating shop of Ransome Machine Co.—later to become a division of Worthington—positioners were pioneered by Worthington people for more than 25 years.

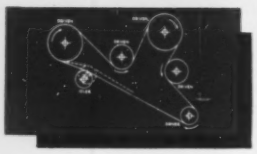
Let us help you increase welding speed up to 280%. For descriptive information on Worthington's line of positioners, automatic welding head manipulators, turning rolls, and head and tailstocks, write to Section Y-76, Worthington Corporation, Plainfield, New Jersey.

WORTHINGTON

How to drive it with Acme chain and sprockets

Acme Precision Roller Chains and Sprockets are easily adaptable for most any drive where maximum efficiency is essential, a few of which are illustrated below.





Acme Chains and Sprockets deliver Positive — Efficient — Economical — Flexible — Rugged — and Quiet Power Transmission. For the solution of your power transmission problems, send them to Acme.

Write Dept. 10P for new illustrated 100 page catalog which includes new engineering section showing 36 methods of chain driving.

Acme Chain Corporation
HOLYOKE MASSACHUSETTS

STEEL
The Metalworking Weekly

Editor-in-Chief, IRWIN H. SUCH
Editor, WALTER J. CAMPBELL
Associate Managing Editors, VANCE BELL, JOHN S. MORGAN

WILLIAM M. ROONEY .....Market Editor
VAN CALDWELL .....Steel Plant Editor
HARRY CHANDLER .....Copy Editor
GLENN W. DIETRICH ...Associate Copy Editor
FRANK R. BRIGGS .....Associate Editor
ROBERT O. JAYNES .....Associate Editor
AUSTIN E. BRANT .....Associate Editor
BYRON E. KENNEL .....Associate Editor
ROSS WHITEHEAD .....Associate Editor
HORACE L. SAMFORD .....Associate Editor

ALLEN G. GRAY .....Technical Editor
ROBERT F. HUBER .....Machine Tool Editor
J. D. KNOX .....Consulting Editor
WILLIAM V. WALLACE JR. ..Assistant Editor
GEORGE J. HOWICK .....Assistant Editor
MARY T. BORGERHOFF .....Assistant Editor
MARY ALICE EARLY .....Assistant Editor
EILEEN CORTES .....Assistant Editor
MARY ANN STUVE .....Editorial Assistant
JANE WEDGE .....Editorial Assistant

BETTY ZAYAC, Editorial Assistant
THOMAS H. BRYAN, TOM WELSH, Art Editors
IRENE KASNER, Editorial Service

Resident Editors

New York 17 .....60 E. 42nd St.
B. K. PRICE, L. E. BROWNE
HAROLD B. WILSON
Murray Hill 2-2581

Chicago 11 .....520 N. Michigan Ave.
ERLE F. ROSS, WILLIAM E. DEAN
Whitehall 4-1234

Pittsburgh 19 .....2837 Koppers Bldg.
ROBERT M. LOVE—Atlantic 1-3211

Detroit 35 .....15800 W. McNichols Rd.
A. DONALD POSTMA
Broadway 3-8150

Washington 4 ....1123 National Press Bldg.
JOHN R. BOTZUM
Executive 3-6849

London, 2 Caxton St., Westminster S. W. 1
VINCENT DELPORT, European Editor

Editorial Correspondents

Birmingham—Birmingham 3-1121 R. W. KINCEY
Buffalo—Emerson 5385 ....GEORGE E. TOLES
Youngstown—Riverside 7-1471..GEO. R. REISS
Los Angeles—Webster 5-3040..NORMAN LYNN
San Francisco—Yukon 6-5151 EDWIN HAVERTY
Seattle—Melrose 1895 .....R. C. HILL

Cincinnati—Beechmont 1-9607...DICK HAVLIN
Toronto, Canada—Empire 4-9655..F. S. TOBIN
Birmingham, England .....J. A. HORTON
Paris, France .....LEON JAUDOIN-PROM
Brussels, Belgium .....PAUL DE KEYSER
Dusseldorf, Germany ....DR. HERBERT GROSS

St. Louis—Parkview 7-1712, MAC L. HUTCHENS

BUSINESS STAFF

Business Manager, D. C. KIEFER

Advertising Director .....H. G. ROWLAND
Advertising Service Mgr. ..DORIS MITCHELL
Production Manager .....A. V. ANDERSON
Classified Advertising .....EVELYN DIETZ

Promotion Director .....S. F. MARINO
Market Research Dir. ....N. R. LADABOUCHE
Circulation Director .....J. C. GERNHARD
Circulation Manager .....G. R. EBERSOLE

Reprints, JUNE SCHILENS

Advertising Representatives

New York 17 .....60 E. 42nd St.
K. A. ZOLLNER, GUY LABAW
Murray Hill 2-2581

Wynnewood, Pa. (Phila.) 200 Wynnewood Ave.
WM. J. VERSCHOOR—Midway 2-6512

Farmington, Conn. .....12 Farmstead Lane
CALVIN FISHER JR., DANIEL J. ROWLAND
Orchard 7-1756

E. Rochester, N. Y. .....217 Ridgeview Dr.
HAROLD A. DENNIS—Browning 2105

Pittsburgh 19 .....2837 Koppers Bldg.
J. C. SULLIVAN—Atlantic 1-3211

Cleveland 13 .....Penton Bldg.
J. K. GILLAM, N. W. MANNING—Main 1-8260

Cincinnati 6 .....2215 Victory Parkway
E. L. FRANKE—Parkway 1-0711

Detroit 35 .....15800 W. McNichols Rd.
C. A. TALLINGER JR.—Broadway 3-8150

Chicago 11 .....520 N. Michigan Ave.
L. C. PELOTT, W. L. POLAND
WM. J. D'ALEXANDER, RICHARD BIRDSONG
Whitehall 4-1234

Los Angeles 36.....5943 W. Colgate Ave.
F. J. FULLER—Webster 1-6865

San Francisco 4 .....57 Post St.
Robert W. Walker Co.—Sutter 1-5568

Griffin, Ga. .....1106 Pine Valley Rd.
FRED J. ALLEN—Griffin 7854

BPA

NBP

Published Every Monday By
THE PENTON PUBLISHING CO., Penton Bldg., Cleveland 13, Ohio
MAin 1-8260

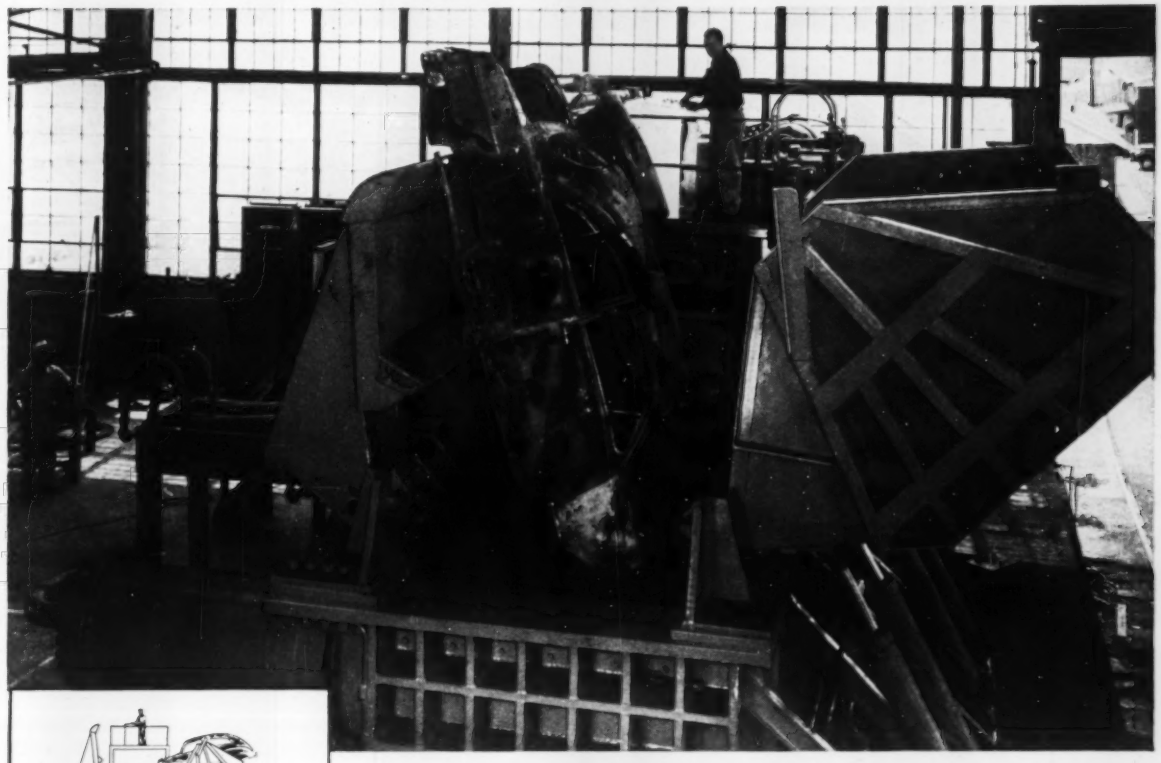
GEORGE O. HAYS .....President
RUSSELL C. JAENKE.....Executive Vice President
FRANK G. STEINEBACH .....Vice President and Secretary
FRANK O. RICE .....Vice President
JOSEPH P. LIPKA .....Treasurer and Assistant Secretary

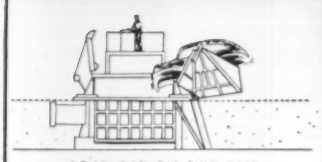
Also Publisher of
FOUNDRY, MACHINE DESIGN, NEW EQUIPMENT DIGEST, AUTOMATION
Member of Business Publications Audit of Circulation Inc., Society of Business Magazine Editors, and National Business Publications Inc.

LOW INVESTMENT PRESS

Bales Entire Car Body

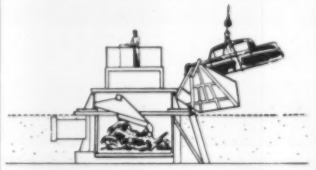
WITHOUT CUTTING OR SHEARING WORK



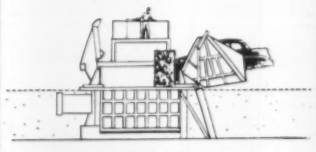


LOAD CAR ON SKIP PAN

CRUSH WITH COMPRESSION DOOR



PUSH IT INTO CHARGING BOX



BALE AND EJECT IT

Fast Pre-Baling Permits Users To Bale a Car Every 2 ½ Minutes

If 50% or more of your baling work is car bodies, the versatile Dempster-Balester 2000 was made for you. Its powerful Auxiliary Compression Door crushes the car body against the Skip Pan Loader and pushes it down into the charging box in a matter of seconds. This eliminates costly cutting-up, shearing and rehandling . . . boosts your production to big-press speeds with a medium size press investment.

Bale Size: 24″ x 24″ x 48″ (Approx.)
Bale Weight: 1500 to 2000 lbs.
Charging Box:
48″ d. x 72″ w. x 144″ l.

Controls: Push Button
Main Rams: Automatic Compression and Return
Mfg. by Dempster Brothers, Inc.

DEMPSTER BROTHERS, Knoxville 17, Tenn., Dept. S-11

DEMPSTER BALESTER®

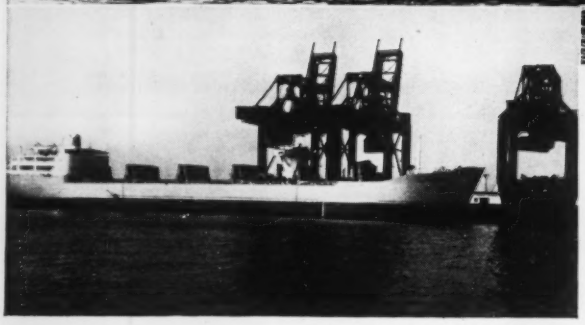
TO: Dempster Brothers Dept. S-11
Knoxville 17, Tenn.

Please Send Complete Information & Literature on the Dempster-Balester 2000.

Name..... Title.....
Company.....
Street.....
City..... State.....

Now in operation

Ore carrier docks at C&O's new 1191-foot pier at Newport News with a 19,000-ton cargo.



The three unloaders will empty the vessel between breakfast and supper time and clean out holds without auxiliary equipment aboard ship.

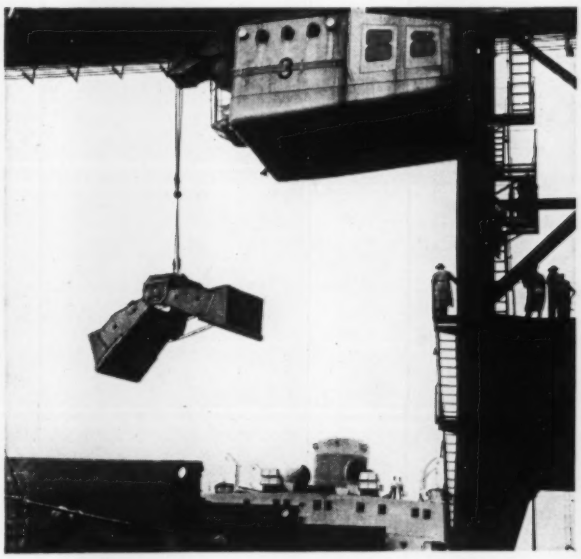
at Newport News, Va.

World's most modern ore unloading facility.

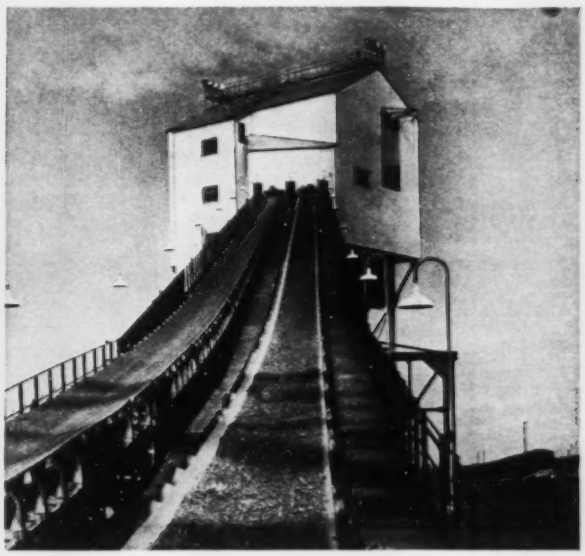
To handle an ever-increasing flow of ore imports by the steel and chemical industries, Chesapeake and Ohio has put into operation the world's most modern and efficient ore unloading facility at its great port of Newport News, Va. Incorporating the best features of American and European designs, the 8½ million dollar installation sets new standards of speed and flexibility for bulk cargo unloaders.

Moving on rails along a finger-type pier designed to accommodate the largest ore carriers afloat, the facility's three unloaders can work vessels on both sides of the pier simultaneously, or as many holds of a single ship. Several sizes of buckets, changeable in less than five minutes, are provided for different types of ore and vessel. Twin belt conveyors and car loading hoppers permit handling two types of ore at the same time without sacrifice of unloading speed. After electronic weighing, accurate to the pound, ore is loaded into thoroughly flushed out open top cars.

With an always ample car supply plus prompt delivery inland by C&O, this facility marks a new high in transportation service for ore importers. Ships now get faster turn-around as well as quick access at C&O's port of Newport News.



A giant bucket drops into the ship's hold to begin unloading at the rate of 18 tons every 45 seconds.



Ore is moved at 600 feet a minute on these conveyor belts to the carloading house.

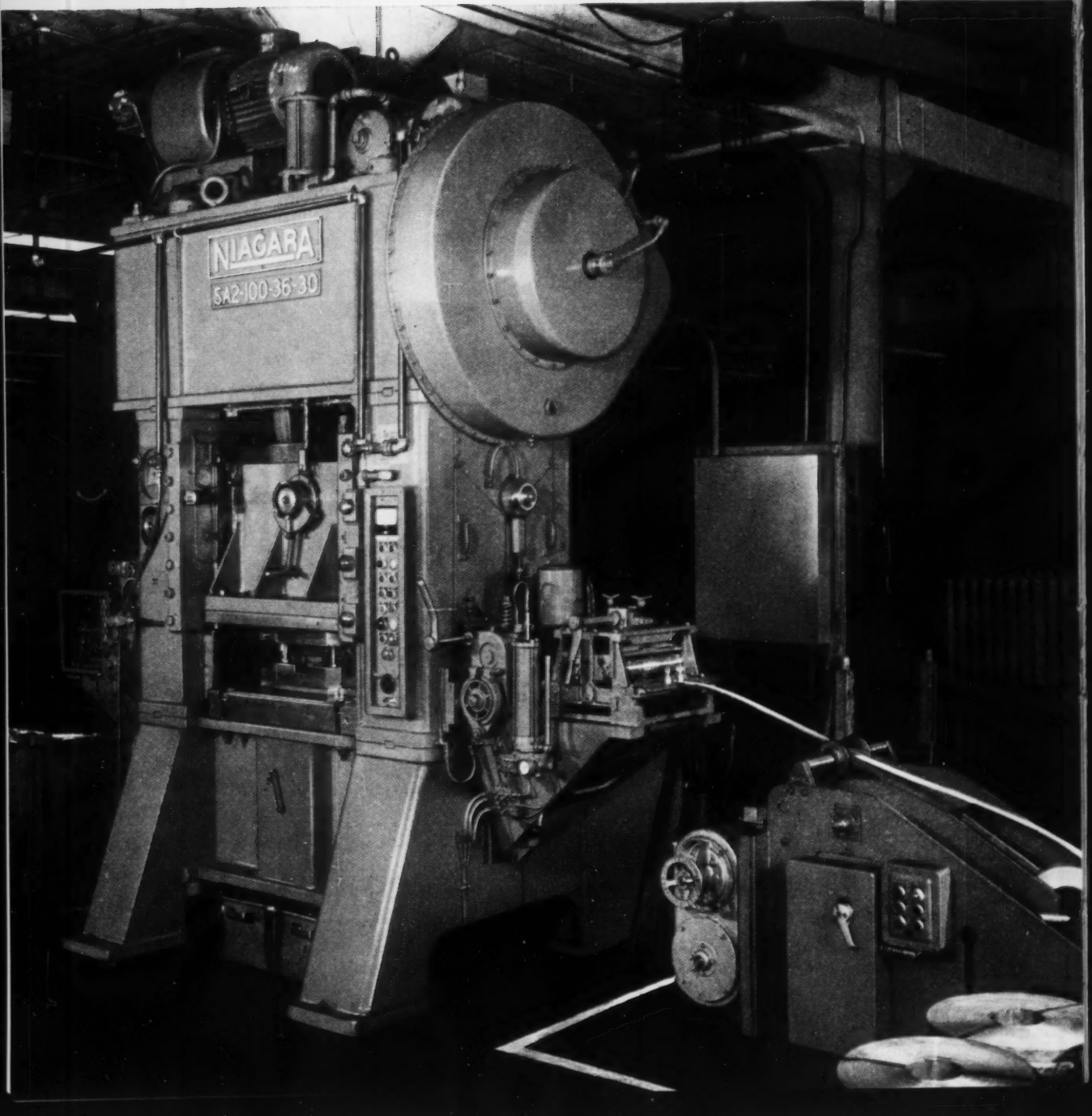
Write for illustrated folder showing in detail the operation of C&O's new bulk cargo unloading facility.

Chesapeake and Ohio Railway

WORLD COMMERCE DEPARTMENT, NEWPORT NEWS, VA.

World Commerce Dept. Offices: New York 7, N. Y., 233 Broadway • Chicago 4, Ill., 327 S. LaSalle Bldg. Detroit 26, Mich., 525 Lafayette Bldg. • Richmond 10, Va., 823 East Main St. • Stockholm, Sweden, Kungsgatan 7

Ready for you... *ALL-NEW*



AUTOMATIC PRESS

to give you more stampings per hour at less cost... in long and short runs

Build your stamping profits to new heights the modern way: Automatically . . . with an all-new Niagara SA-2. Here's an up-to-the-minute press package that is distinctly different from anything heretofore available . . . complete with ultra-modern automatic feed, plus today's most advanced press mounted controls and devices, to bring you high speed stamping at its very best.

Brand new from crown to base, the Niagara Automatic boasts bonus features throughout . . . features that are unavailable on any other press in this category. Yes, *everything* is new about it, differing sharply from modified, adapted straight side presses of conventional design. Every square inch of its extra massive, rugged construction is *heavier . . . far heavier* for vibration-free, precision performance at high speeds:

KING SIZE CRANKSHAFT AND CRANKPINS — substantially larger than those on traditional straight side presses.

ENTIRE DRIVE IS HEAVIER — gears, electro pneumatic friction clutch, brake, flywheel and motor.

EXTRA BEARINGS — for better support of crankshaft, feed take-off and main gear (or flywheel).

MASSIVE, EXTRA HEAVY FRAME — all steel, 4-piece, tie rod, box type construction (bed, uprights and crown) built to absorb shock and vibration, and provide greater resistance to deflection. Up to 100% heavier than regular straight side press construction. Uprights extra wide to house electrical and circulating oil controls.

RIGID, EXTRA REINFORCED, BOX TYPE SLIDE remains in precise alignment with bed.

EXTRA LONG, SPECIAL SQUARE GIBS guide slide precisely.

LAMINATED, NON-METALLIC WAYS positively prevent welding or galling of bearing surfaces.

AUTOMATIC CIRCULATING OIL SYSTEM keeps all press bearing surfaces continuously lubricated.

ULTRA-MODERN AUTOMATIC FEED perfectly mated to press.

EXCLUSIVE NIAGARA MECHANICAL ROLL LIFTING SYSTEM — built into the press for independent, infinite adjustment of ingoing — outgoing rolls, from floor level.

OVERSIZE ADJUSTABLE AIR COUNTERBALANCE for smoother, safer press performance.

From start to finish, automatic stamping the Niagara SA-2 way, spells endless economies for you. It will pay you to investigate the facts *now*.

THE FULL STORY is unfolded for you, feature by feature, in new, illustrated Bulletin 264. Write for your copy today . . . then consult a Niagara representative.

NIAGARA MACHINE & TOOL WORKS, BUFFALO 11, N. Y.

DISTRICT OFFICES: Boston • Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia

Distributors in principal U. S. cities and major foreign countries

NIAGARA

SERIES SA-2, TWO-POINT STRAIGHT SIDE PRESSES

SHAFT DIAMETERS: 4½-9 INCHES • CAPACITIES: 60-300 TONS

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work

STRIP for action . . .

The efficient action of a Flat Spring is dependent upon the quality of the STRIP STEEL.

WASHBURN

has over fifty years of experience in solving spring steel problems, to guarantee the quality of your product.

Flat Tempered and Untempered Wire in .50 to 1.25 Carbon Range.

Flat Cold Rolled Strip 6" and Narrower, Bright, Galvanized, Tinned and Cadmium Finish.

Round Untempered Low and High Carbon Spring Wires.

WASHBURN WIRE COMPANY, NEW YORK CITY

WASHBURN

184

CLEAN, UNIFORM BILLETS — STRIP — RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

CALENDAR OF MEETINGS

Nov. 25-27, American Management Association: Special conference on "Operations Research," Palmer House, Chicago. Association's address: 1515 Broadway, New York 36, N. Y.

Dec. 1-6, American Society of Mechanical Engineers: Annual meeting, Hotel Statler, New York. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Dec. 2-6, Exposition of Chemical Industries: Coliseum, New York. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y. President: E. K. Stevens.

Dec. 4-6, American Institute of Mining, Metallurgical & Petroleum Engineers: Electric furnace steel conference, William Penn Hotel, Pittsburgh. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: E. O. Kirkendall.

Dec. 4-6, Building Research Institute: Conference on adhesives and sealants in building, Shoreham Hotel, Washington. Institute's address: 2101 Constitution Ave., Washington 25, D. C. Executive director: William H. Scheick.

Dec. 5-7, National Association of Manufacturers: Congress of American Industry, Waldorf-Astoria Hotel, New York. Association's address: 14 W. 49th St., New York 20, N. Y. Managing director: Kenneth R. Miller.

Dec. 10-11, Society of the Plastics Industry Inc.: Conference on vinyl products in the consumer field, Hotel Commodore, New York. Society's address: 250 Park Ave., New York 17, N. Y. Executive vice president: William T. Cruse.

Dec. 11-12, National Construction Industries Conference: Hotel Sherman, Chicago. Sponsor: Armour Research Foundation, 10 W. 35th St., Chicago 16, Ill.

1958

Jan. 6-8, Southern Industrial Distributors' Association: Midyear meeting, Roosevelt Hotel, New Orleans. Association's address: 1626 Fulton National Bank Bldg., Atlanta 3, Ga. Secretary: E. L. Pugh.

Jan. 16-17, National Industrial Conference Board Inc.: General session for all associates, Hotel Commodore, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Jan. 17, Malleable Founders' Society: Semiannual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

Jan. 19-22, Institute of Scrap Iron & Steel Inc.: Annual meeting, Eden Roc, Fontainebleau, and Deauville hotels, Miami Beach, Fla. Institute's address: 1729 H St. N. W., Washington 6, D. C. Executive vice president: Edwin C. Barringer.

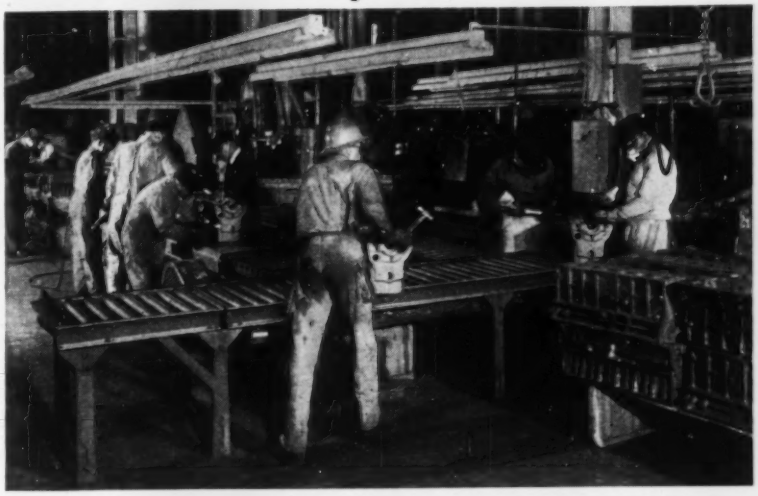
Jan. 20-22, Truck Trailer Manufacturers Association: Annual meeting, Palm Beach Biltmore Hotel, Palm Beach, Fla. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

Jan. 20-23, American Road Builders Association: Annual meeting, Sheraton-Park Hotel, Washington. Association's address: 600 World Center Bldg., Washington 6, D. C. Executive vice president: Louis W. Prentiss.

Jan. 20-24, American Institute of Electrical Engineers: Winter meeting, Hotel Statler, New York. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: E. O. Kirkendall.

Jan. 21-22, Steel Shipping Containers Institute Inc.: Winter meeting, St. Regis Hotel, New York. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

Ask Standard ... how to cut costs with conveyors



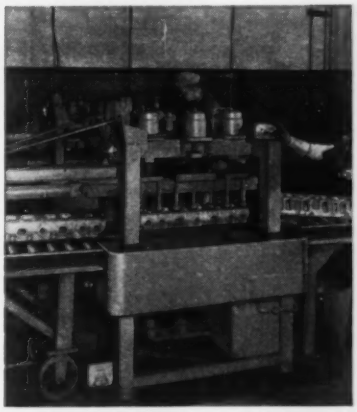
Cylinder blocks are chipped, ground and inspected on Standard Roller Conveyor line.

Eastern foundry simplifies cylinder block handling with roller conveyors

HERE'S another installation in which Standard Roller Conveyors are keeping heavy, bulky components flowing to machining and assembly points with minimum manpower and practically no time loss.

Easy to set up and exceptionally sturdy, Standard Roller Conveyors (live or gravity) can also be job-tailored to your specific materials handling problem — permanent or temporary.

And roller conveyors are only one of the many types of Standard conveyors. Others include belt, slat, chain, pushbar or sectional conveyors as well as spiral chute systems.



Standard Roller Conveyors are available from stock in a wide range of roller diameters, centers and frames.

Call the Standard engineer listed in your classified phone book or write direct for Bulletin 68 — Address Dept. Y-11.

Why not take advantage of Standard's half-century of conveyor application experience. Consult STANDARD CONVEYOR COMPANY. General offices: North St. Paul 9, Minnesota. Sales and service in principal cities.

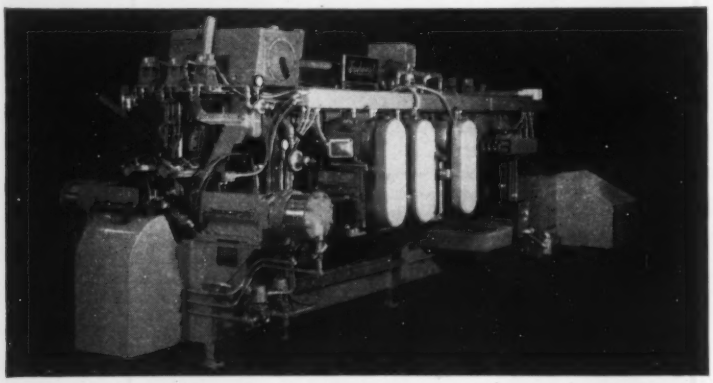
one-source production lines spark interest of volume producers...

The prospect of ordering an entire production line, ready made to produce a part to specification, has arrested the interest of many of the nation's top production engineers.

One source responsibility assuring better service; a line 100% harmonic, all stations engineered to work in perfect synchronization; integrated and automated handling of work in process; utilization of common drives and bases, reducing operating costs and floor area, are some of the advantages of the packaged line that has production people talking.

Federal/Warco pioneered the packaged line and have already produced automated lines combining such operations as blanking, forming, drawing, welding, machining, drilling, assembling on a common base.

For additional information contact the Federal/Warco representative nearest you or write direct.



This Federal Packaged Production line welds, spot faces, reams, de-burrs, sets six bolts and welds them in place . . . ejecting finished pedal brackets at a rate of 775 pieces per hour.

Federal / Warco
PACKAGED
PRODUCTION LINES

THE FEDERAL MACHINE AND WELDER COMPANY - WARREN, OHIO

422

AFFILIATED WITH BERKELEY-DAVIS, INC., DANVILLE, ILLINOIS, MANUFACTURERS OF AUTOMATIC ARC WELDING EQUIPMENT.

USS "T-1" Steel reduces weight of lift truck carriage assembly by 66%

INCREASES PAY LOAD PROPORTIONATELY

THE YARDLIFT 350®, manufactured by Ross Carrier Division of Clark Equipment Company, is designed to handle heavy materials on uneven ground. It has a lifting capacity of 35,000 pounds. Many vital strength members of the lifting mechanism are fabricated of USS "T-1" Steel. The reason is elementary: in fork-truck design every extra pound of mechanism forward of the front wheels reduces the machine's load capacity.

According to Clark design computations, the YARDLIFT 350's carriage assembly, if made of structural carbon steel, would have weighed nearly 3 times as much as the "T-1" Steel assembly to obtain the same capacity. And it would have been 3 times bulkier. USS "T-1" Steel, in other words, permitted maximum load capacity at *one-third* the weight and size . . . and increased pay load substantially.

The secret is USS "T-1" Steel's 90,000 psi yield point, nearly 3 times that of structural carbon steel. It is this strength that helped make the YARDLIFT 350 possible. And USS "T-1" Steel's high impact resistance and toughness, even at sub-zero temperatures, enable the YARDLIFT 350 to withstand the jolts and jars of rough yard work even in the severest winter weather.

Why don't you take advantage of the unique combination of strength and toughness that USS "T-1" Steel has to offer? It may be the most economical steel you can use. It certainly is at Clark because *many lift trucks now on their drawing boards incorporate USS "T-1" Steel.*

• • •

Our new catalog—USS "T-1"—is complete with technical information and offers many practical suggestions for its use that can save you money. For your free copy, write United States Steel Corporation, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

USS and "T-1" are registered trademarks.

UNITED STATES STEEL

USS

United States Steel Corporation, Pittsburgh · Columbia-Geneva Steel Division, San Francisco · Tennessee Coal & Iron Division, Fairfield, Ala.
United States Steel Supply Division, Warehouse Distributors, Coast-to-Coast
United States Steel Export Company, New York

"No forging ever had a more

says **John A. Lynch,** *United States Steel Inspector, Homestead Forgings Division*

THAT USS Quality Forging in the picture will serve in one of the most critical applications you can imagine. It will be the head for a nuclear reactor containing a deadly radioactive load under extremely high pressure and temperature.

The forging is made from a manganese-nickel-molybdenum steel. Its forged weight was about 48 tons, but it was machined to 13½ tons. The machining was a little tricky because the underside of the forging is concave, and the entire piece is tapered slightly towards the edges. It's about 17″ thick in the center, 13″ thick at the outer edges.

Inspector Lynch handled the extensive testing required for this forging, and few men are better qualified for the job. He has been a USS Inspector for over 20 years, and his father, John C. Lynch, was an Inspector for 30 years before he retired in 1943. This is fairly common in the Homestead Forgings Division . . . finding a son or grandson who is carrying on in some highly skilled activity.

This nuclear forging received the usual close examination for dimensional accuracy. In addition, tensile, impact, microscopic and magnetic particle tests, and *three* separate sonic examinations were made. Of course, these tests are

careful inspection"

common for large, quality forgings, but it takes a man like John Lynch to interpret the results.

No matter what kind of USS Quality Forging you buy, men like John Lynch do the actual work on it. Scour the world, and you won't find better forging men—and they have the steel and equipment to back them up.

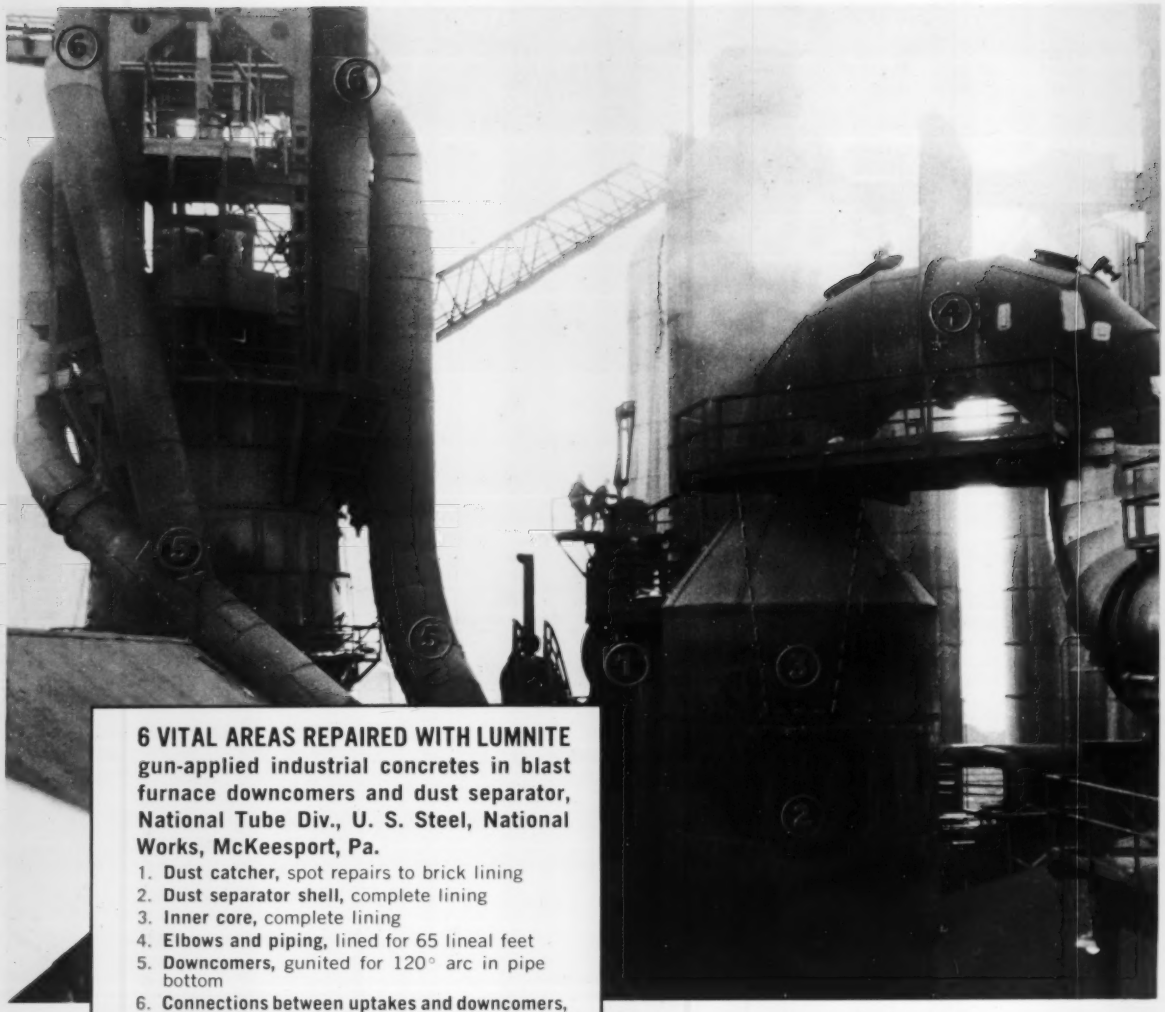
Please mail inquiries or requests for our free 32-page booklet on USS Quality Forgings to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS QUALITY FORGINGS

heavy machinery parts... carbon, alloy, stainless
forged steel rolls and back-up roll sleeves
electrical and water wheel shafts
specialty forgings of all types

USS

UNITED STATES STEEL



6 VITAL AREAS REPAIRED WITH LUMNITE
gun-applied industrial concretes in blast furnace downcomers and dust separator, National Tube Div., U. S. Steel, National Works, McKeesport, Pa.

1. **Dust catcher,** spot repairs to brick lining
2. **Dust separator shell,** complete lining
3. **Inner core,** complete lining
4. **Elbows and piping,** lined for 65 lineal feet
5. **Downcomers,** gunited for 120° arc in pipe bottom
6. **Connections between uptakes and downcomers,** spot-repaired (two other connections gunited not shown)

Atlas LUMNITE* industrial concretes protect blast furnace "hot" spots

- Industrial concrete linings made with Lumnite cement will resist abrasion, corrosion and heat.
- Placement is fast and easy, by guniting, casting or troweling—service strength is reached in less than 24 hours.
- Outage is reduced to a minimum.

For maximum convenience, use Lumnite-made castables. These are packaged mixtures, ready for use. Just add water, mix and place. Made and distributed by leading manufacturers of refractories.

Write for your copy of the new "Lumnite Mortar Manual," describing gun-applied linings: Universal Atlas, 100 Park Avenue, New York 17, N. Y.

UNIVERSAL ATLAS CEMENTS

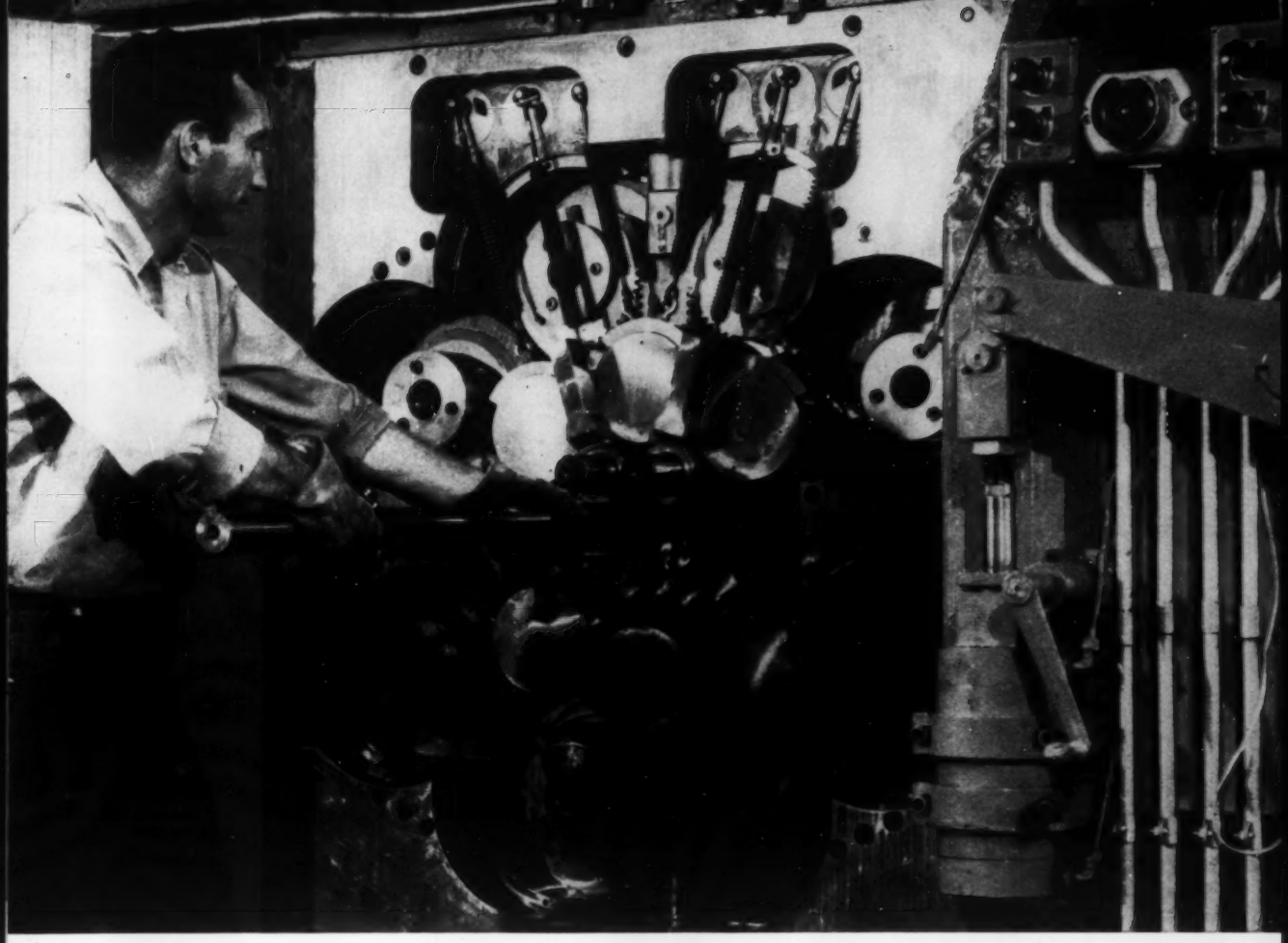
USS

*"LUMNITE" is the registered trademark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

L-158

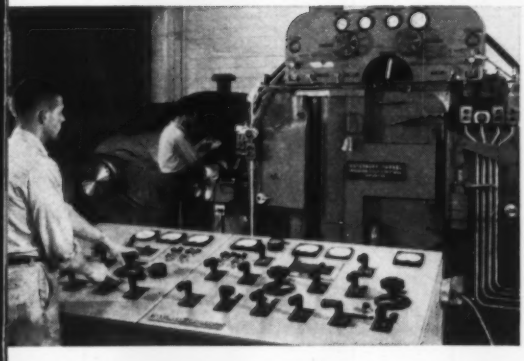
UNIVERSAL ATLAS CEMENT COMPANY—member of the industrial family that serves the nation—**UNITED STATES STEEL**

OFFICES: *Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco*



Westinghouse drives and control help . . .

Eastern Stainless Steel Corporation increase production



Extensive experience enabled Westinghouse engineers to provide both unusual control accuracy and drive dependability required for this new 49″ Sendzimir mill. The new mill demanded drives and control for high versatility and watch-like precision to produce a wider range of light-gauge stainless steel.

The reel motors are supplied by individual generators and are accurately controlled by Westinghouse Magamp* regulators for speeds up to 700 ft./min. Power is supplied by a 3125-kw M-G set to motors which total 3750 hp.

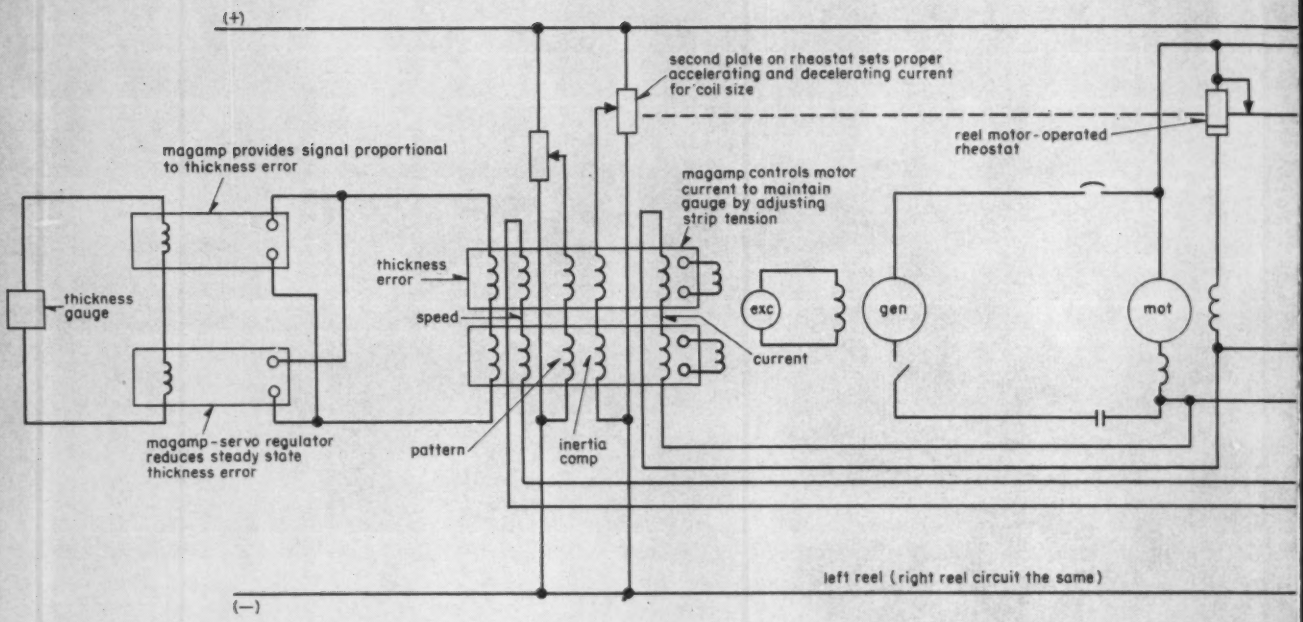
Today, developments in mill drives enable Westinghouse to help you gain closer tolerances with automatic control *this way* ▶

*Trademark

MP-3059

Operating control is centrally located on this console.

YOU CAN BE SURE...IF IT'S Westinghouse



Increase strip accuracy to ± .0001″

. . . with Westinghouse automatic gauge control

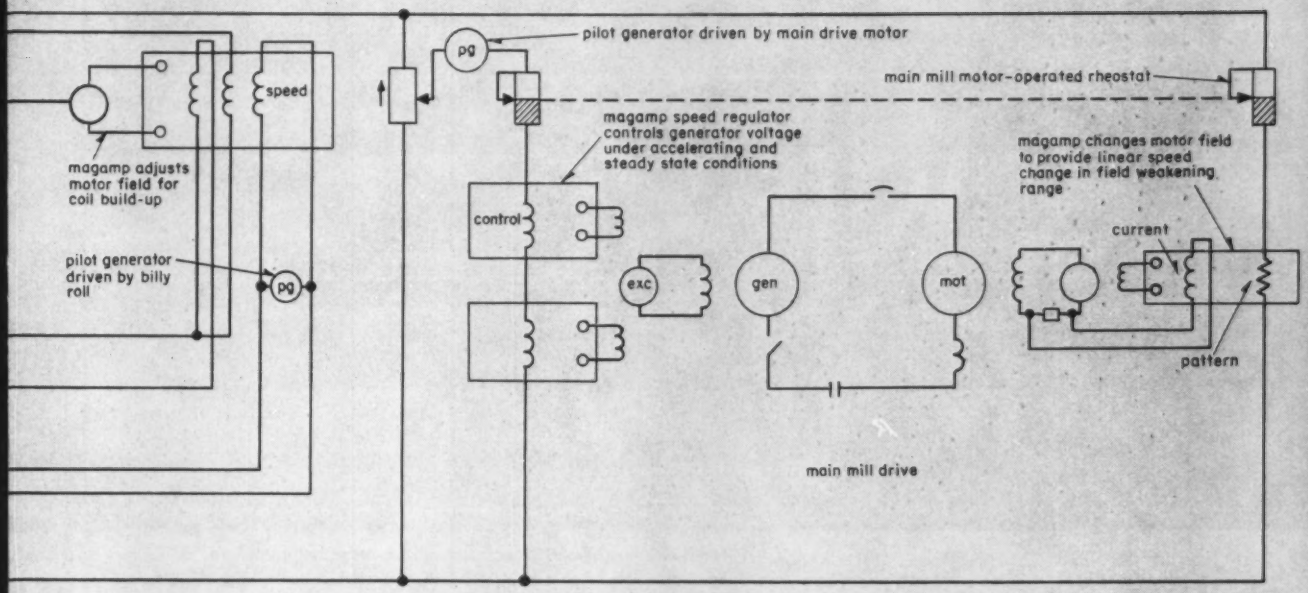
Increased accuracy and flexibility are engineered into Westinghouse drive systems for any single-stand, cold-reversing mill . . . such as shown above. Developments in automatic gauge control and Magamp regulator systems make it possible for you to maintain extremely close tolerance of ±.0001″. And, at the same time, you have ease of adjustment for quick change from one product to another. Here's how Westinghouse control and main drive equipment give consistant, high quality results:

Automatic gauge control circuit varies the strip tension to maintain uniform thickness of finished strip as measured by thickness gauge.

For mills equipped with regulating tensiometers, the signal from the tensiometer maintains constant tension by regulating the reel motor current. A tension rheostat furnishes the pattern field adjustment.

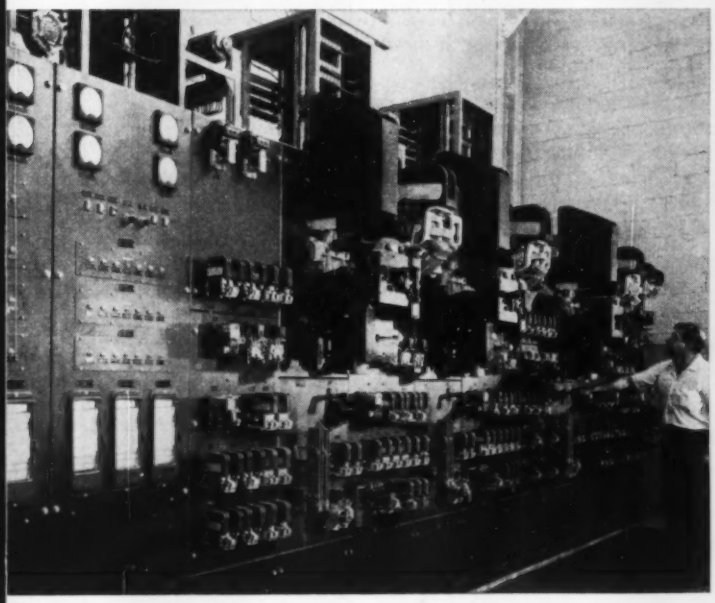
Magamp regulator system compensates for coil build-up by automatically regulating the speed of reel motors. Magamp's high amplification and extremely short response time assure accurate generator voltage control for optimum overall performance.

YOU CAN BE SURE... IF IT'S Westinghouse

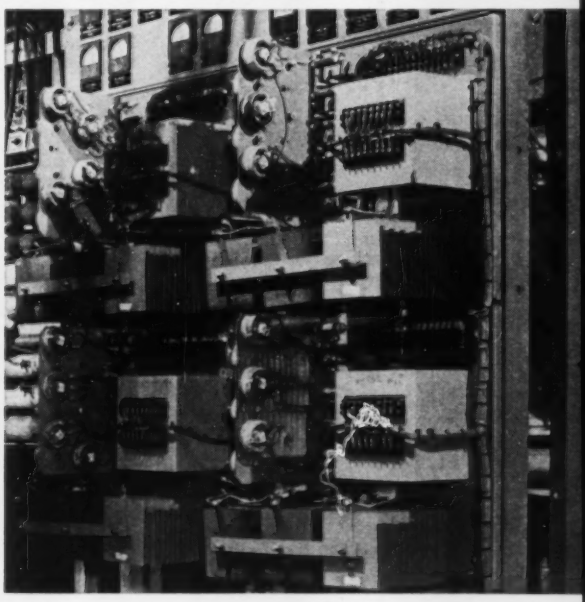


Cold reversing mill system-diagram shows control that can be realized with Westinghouse motors and control components.

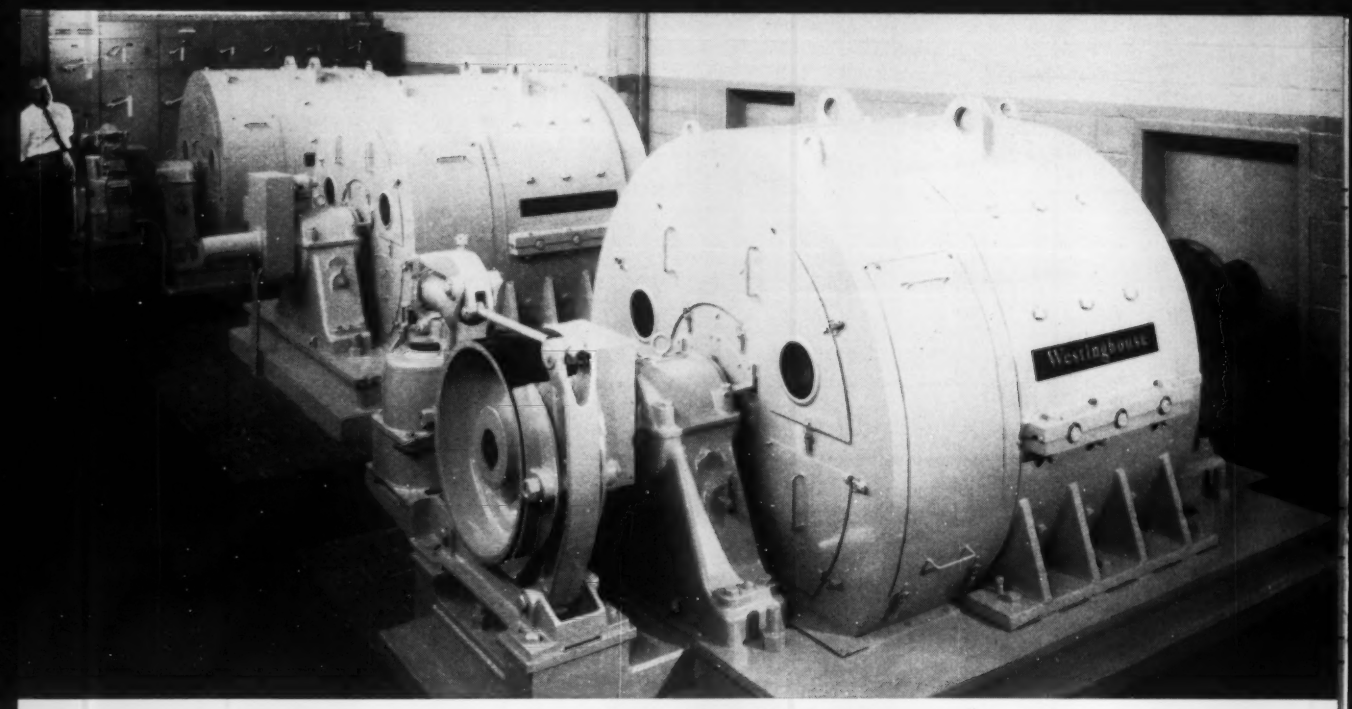
Main drive control panels with main circuit breakers (top) and memory-type fault finder on left. System faults are indicated instantly and recorded to make trouble shooting easy.



Magamp regulators are mounted in the rear of the main drive.

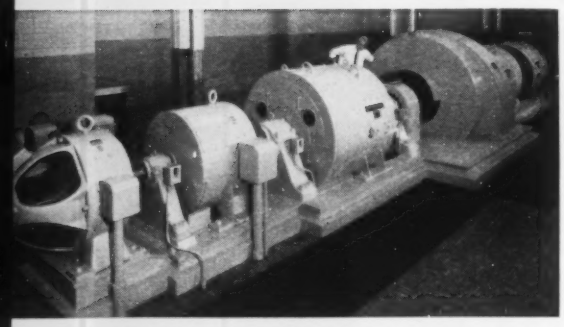


for dependable drive power . . .



Three 1250-hp 200/600-rpm motors are interchangeable for main drive and reels on typical Sendzimir mill. Oversize bearings insure longer bearing life and minimum maintenance.

Westinghouse drives are tailor-made to meet your specifications



Power for main drive motors of Sendzimir mill is supplied by three 125-kw M-G sets with three 1000-kw main drive generators and 3000-hp synchronous driving motor.

Life-Line® "H" motors with silicone insulation achieve up to 55% reduction in armature inertia by decreasing armature size. With commutating ability increased 35%, the Life-Line "H" assures faster reversing performance.

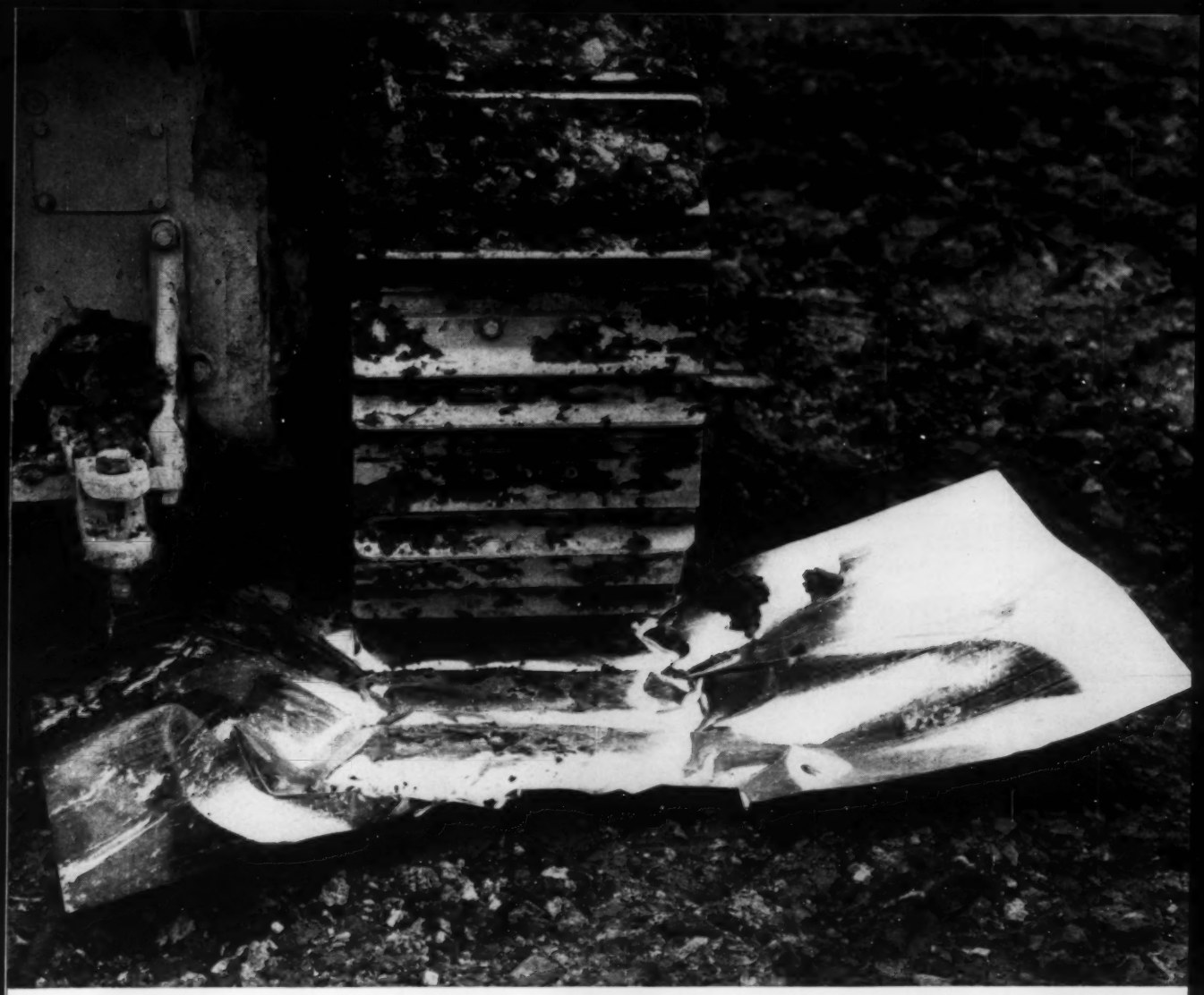
Westinghouse main drive equipment supplies the power needed for heavy reduction on Sendzimir and other cold rolling mills. Armature coils on all large rotating equipment are protected with Thermalastic® Insulation for three times greater dielectric strength under varying temperature conditions.

Rubber-mounted sight-glass windows on generators and motors provide for easy inspection of commutation under operating conditions. Commutator covers are easily opened for routine maintenance. Full-length commutating poles provide improved commutation under varying load conditions.

Westinghouse steel mill experience in all types of drive and control problems can help in your next planning or design session. A Westinghouse team will accept unit responsibility and work with your engineering staff. Contact your Westinghouse sales office or write: Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Penna.

YOU CAN BE **SURE**... IF IT'S

Westinghouse



WE TORTURED THAT WEIRKOTE® TILL IT HURT US TO LOOK!

The heavy tractor's treads crunched into the Weirkote steel, rocked back and forth, gave Weirkote's tight zinc coating a wicked test.

It passed perfectly.

Weirkote shrugs off punishment like that—or far worse—in everyday production. Its continuous-process zinc coating goes through all the severe fabrication steps flawlessly. Spin it, deep-draw it, crimp it, roll-form or extrude it. There's no flaking or peeling when Weirkote's on the job.

And look at this for savings! Because Weirkote's zinc coating stays put, you can eliminate the cost of plating, painting or redipping after fabrication. In many jobs, the lubricating property of the zinc coating will prolong die life, too.

Free Weirkote Booklet!

Send for all the facts on Weirkote. Write Weirton Steel Company, Dept. B-5, Weirton, West Virginia.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

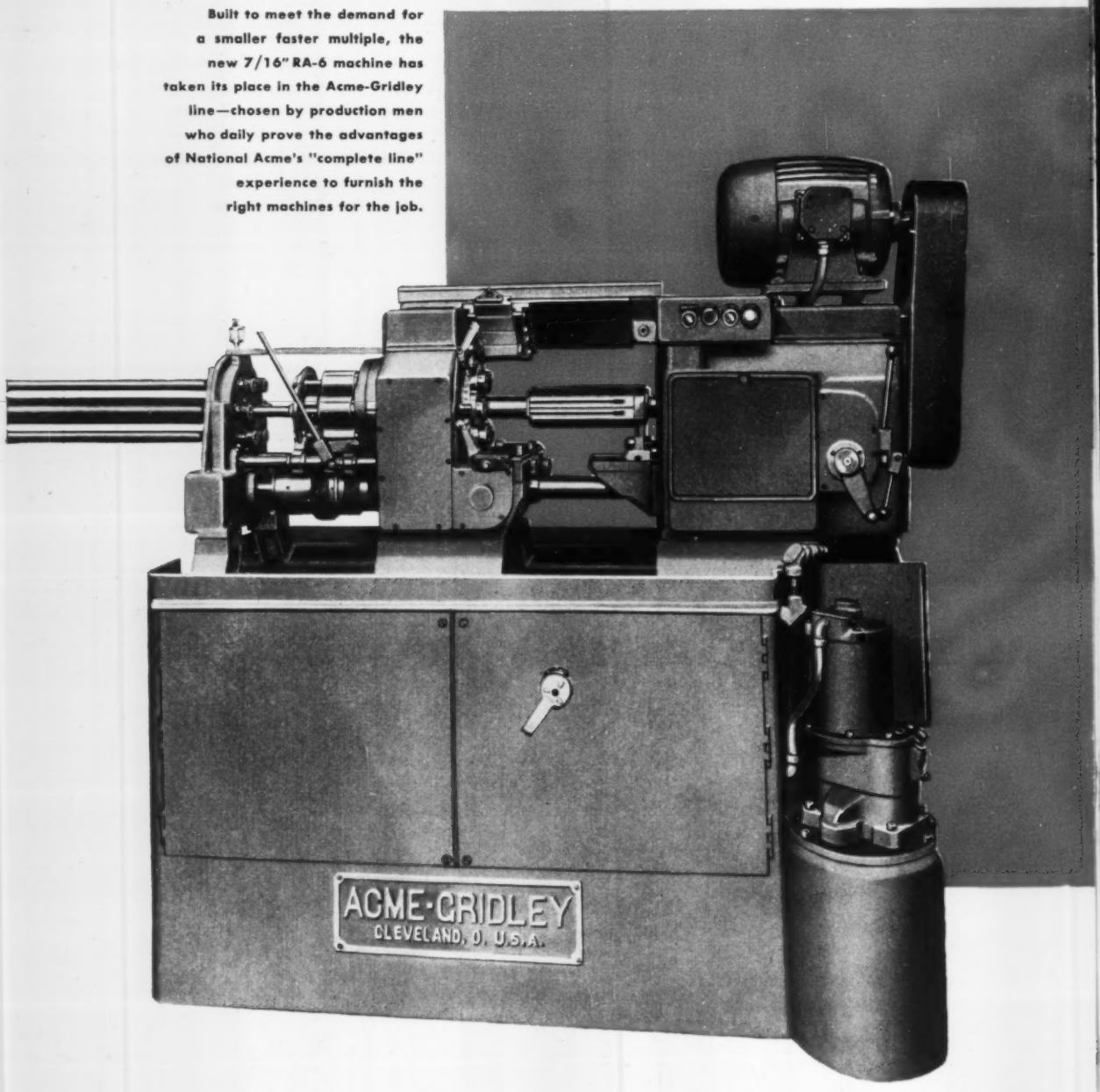
NATIONAL STEEL CORPORATION

LIKE ALL

Acme-Gridley

BAR AUTOMATICS . . . .

Built to meet the demand for a smaller faster multiple, the new 7/16" RA-6 machine has taken its place in the Acme-Gridley line—chosen by production men who daily prove the advantages of National Acme's "complete line" experience to furnish the right machines for the job.



. . . THE NEW 7/16" SIX

gives you lowest cost per piece

HIGH PRODUCTION ACCURACY—sustained at highest speeds and feeds through proper weight distribution and support of toolholders without overhang.

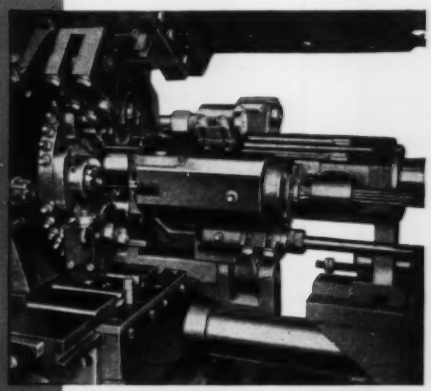
WIDE TOOLING VERSATILITY—through independently operated cross slides, spindle stopping (optional) and a variety of standard and special attachments.

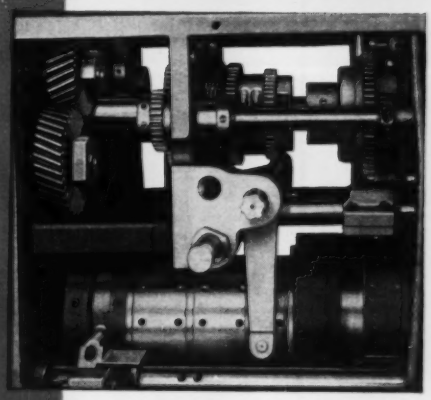
LONG OPERATING DEPENDABILITY—with extra reserve power and strength for top performance with *all* tools.

★ ★ ★

Let our representative show you how Acme-Gridleys can work for you; meanwhile, *write for your copy of* MRA-56 *for specifications of the new 7/16" Six.*

Unusually large tooling zone permits ready access for installation and adjustment of tools and attachments. All slides are wide and heavy, providing maximum support without overhang.





Gear box section accommodates drive control for all accelerated end-working attachments, spindle speeds and feeds . . . easily accessible through large openings on either side.

INDEX . . . to lower machining costs... with *Acme-Gridley* **CONTROLLED CYCLE**

National Acme

THE NATIONAL ACME CO.
189 EAST 131ST STREET
CLEVELAND 8, OHIO

Sales Offices . . . Newark, N. J. . . . Detroit, Mich. . . . Chicago, Ill.

Got a metal stamping problem?

You may need the machinability and toughness of **AIRKOOL-S** Tool and Die Steel—one of the many Crucible Tool Steels available from stock

You can cut machining costs, get longer tool and die life by using a steel that offers machinability *plus* high resistance to abrasion and wear.

Airkool-S Tool and Die Steel provides both these qualities. It machines 25 to 35% easier than conventional A2 steel and is easily broached and filed. Yet it's tough, non-deforming and deep-hardening—just what you need for blanking, coining, shearing and punching.

Crucible Airkool-S Tool and Die Steel is only one of the dozens of tool steel grades stocked at local Crucible warehouses. Ask the Crucible staff about any grade. They'll gladly give you complete information and first-hand assistance with fabrication.

Crucible is the only specialty steel producer *fully integrated to the point of use.* That means control and responsibility from raw material to warehouse delivery to you.

STOCKS MAINTAINED OF:

Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting Die and Plastic Mold Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el, Hy-Tuf, AISI Alloy . . . Onyx Spring, Hollow Drill Steel and other special purpose steels.

CRUCIBLE WAREHOUSE SERVICE

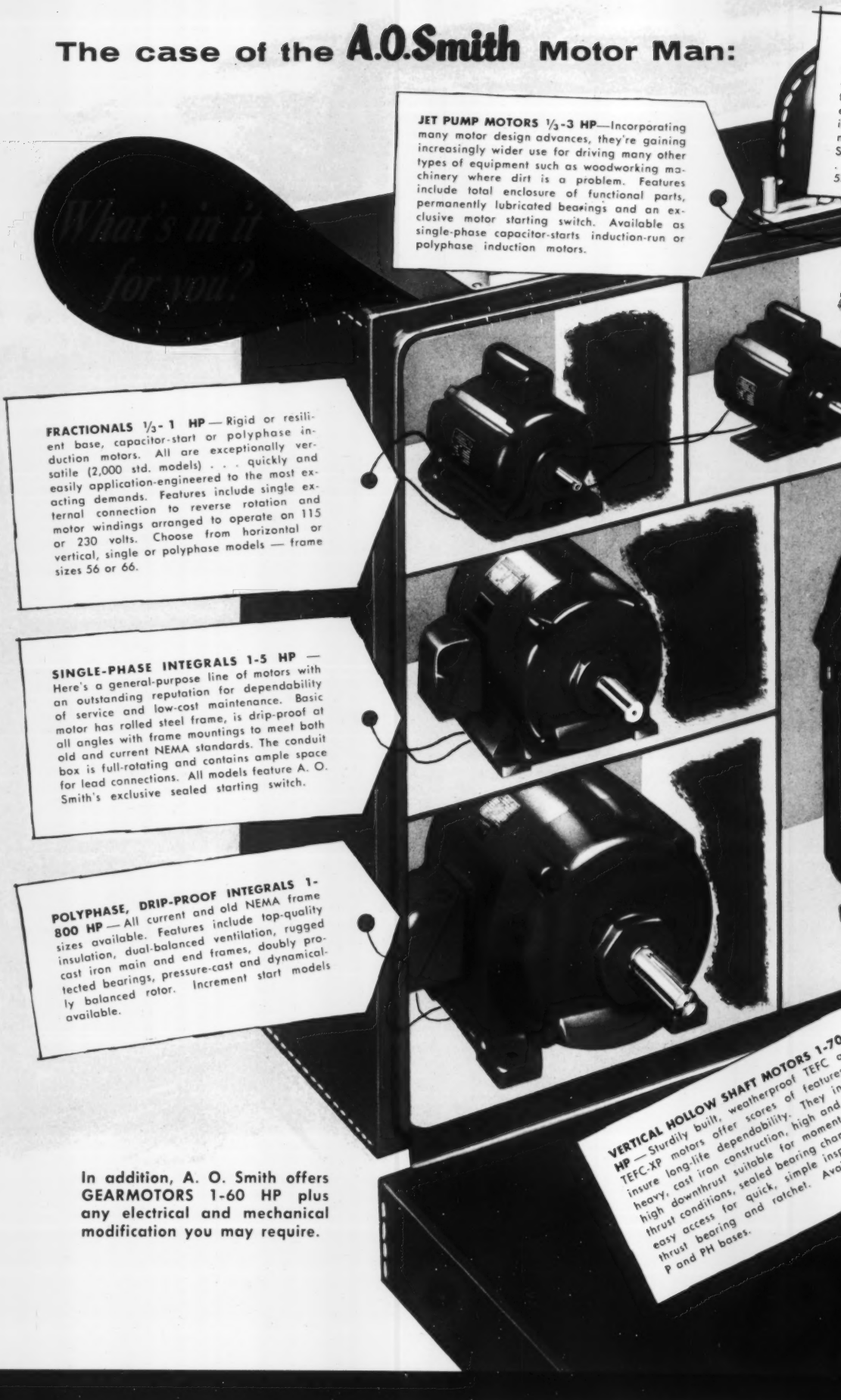
Crucible Steel Company of America

General Sales Offices, The Oliver Building, Mellon Square, Pittsburgh 22, Pa. Branch Offices and Warehouses: Atlanta • Baltimore Boston • Buffalo • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Dayton • Denver • Detroit • Grand Rapids Harrison • Houston • Indianapolis • Los Angeles • Milwaukee • New Haven • New York • Philadelphia • Pittsburgh • Portland, Ore. Providence • Rockford • San Francisco • Seattle • Springfield, Mass. • St. Louis • St. Paul • Syracuse • Toronto, Ont.

The case of the **A.O.Smith** Motor Man:

What's in it for you?

The case of the A.O.Smith Motor Man:



JET PUMP MOTORS 1/3-3 HP—Incorporating many motor design advances, they're gaining increasingly wider use for driving many other types of equipment such as woodworking machinery where dirt is a problem. Features include total enclosure of functional parts, permanently lubricated bearings and an exclusive motor starting switch. Available as single-phase capacitor-starts induction-run or polyphase induction motors.

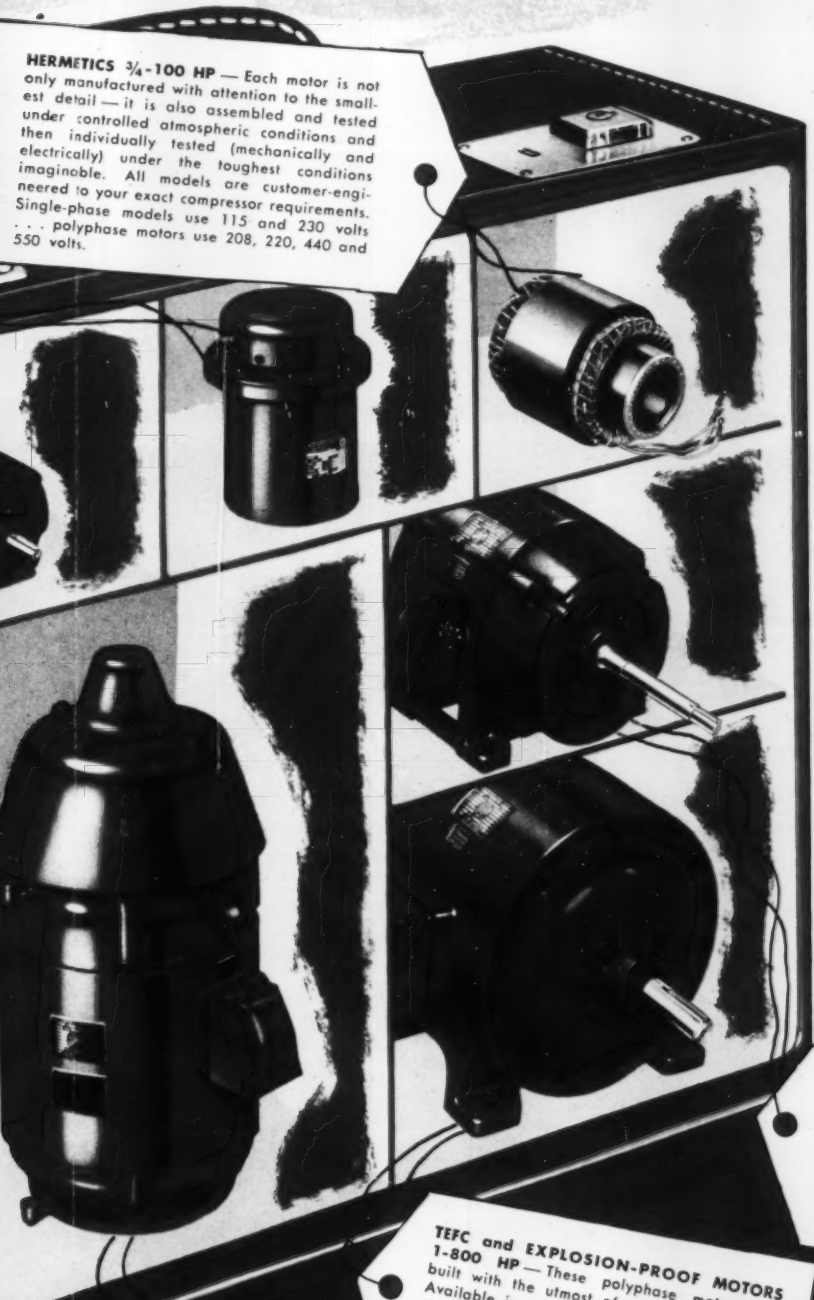
FRACTIONALS 1/3- 1 HP — Rigid or resilient base, capacitor-start or polyphase induction motors. All are exceptionally versatile (2,000 std. models) . . . quickly and easily application-engineered to the most exacting demands. Features include single external connection to reverse rotation and motor windings arranged to operate on 115 or 230 volts. Choose from horizontal or vertical, single or polyphase models — frame sizes 56 or 66.

SINGLE-PHASE INTEGRALS 1-5 HP — Here's a general-purpose line of motors with an outstanding reputation for dependability of service and low-cost maintenance. Basic motor has rolled steel frame, is drip-proof at all angles with frame mountings to meet both old and current NEMA standards. The conduit box is full-rotating and contains ample space for lead connections. All models feature A. O. Smith's exclusive sealed starting switch.

POLYPHASE, DRIP-PROOF INTEGRALS 1-800 HP — All current and old NEMA frame sizes available. Features include top-quality insulation, dual-balanced ventilation, rugged cast iron main and end frames, doubly protected bearings, pressure-cast and dynamically balanced rotor. Increment start models available.

VERTICAL HOLLOW SHAFT MOTORS 1-70 HP — Sturdily built, weatherproof TEFC TEFC-XP motors offer scores of features insure long-life dependability. They in heavy, cast iron construction, high and high downthrust suitable for moment thrust conditions, sealed bearing char easy access for quick, simple insp thrust bearing and ratchet. Avo P and PH bases.

In addition, A. O. Smith offers GEARMOTORS 1-60 HP plus any electrical and mechanical modification you may require.



HERMETICS ¾-100 HP — Each motor is not only manufactured with attention to the smallest detail — it is also assembled and tested under controlled atmospheric conditions and then individually tested (mechanically and electrically) under the toughest conditions imaginable. All models are customer-engineered to your exact compressor requirements. Single-phase models use 115 and 230 volts . . . polyphase motors use 208, 220, 440 and 550 volts.

A. O. Smith offers the 3rd full line of electric motors— ⅓ to 800 hp

CLOSE-COUPLED PUMP MOTORS 1-75 HP — Drip-proof, TEFC and TEFC-XP motors specifically designed for all types of centrifugal pumps. Like all A. O. Smith motors, these units are application-engineered to each specific requirement. Modifications can be easily made to provide top-flight performance on different power sources. Frame sizes range from NEMA 182CZ to 445CZ and 203CZ through 445CZ.

TEFC and EXPLOSION-PROOF MOTORS 1-800 HP — These polyphase motors are built with the utmost of care and precision. Available in current NEMA frame sizes 182 through 505 as well as old NEMA sizes. Designed for trouble-free use in process industries, chemical plants, concrete plants and similar rugged-duty applications.

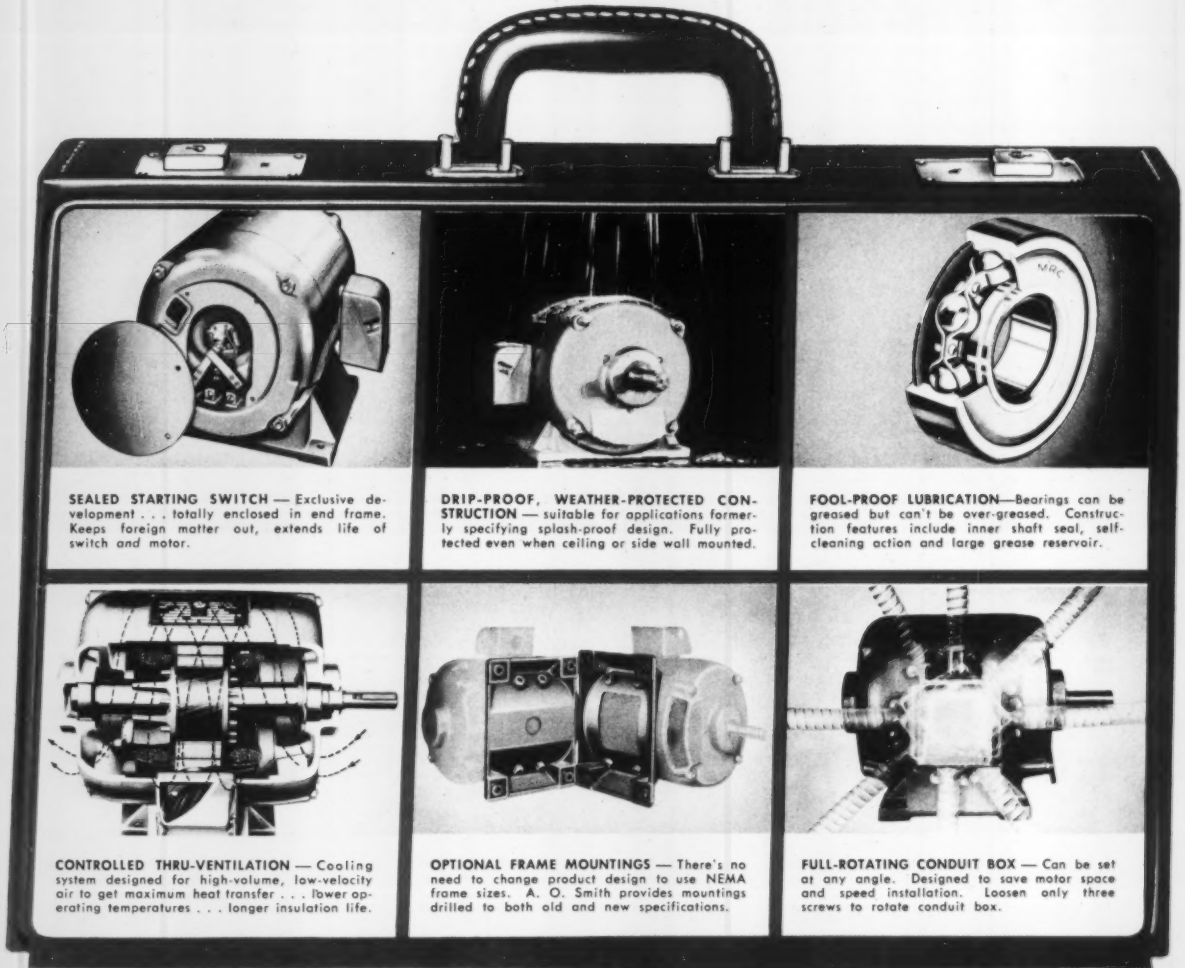
-700
C and
ures to
include
and extra-
entary up-
chamber and
inspection of
Available with

Here's complete hp to broaden your buying range

. . . plus exclusive features no other motor manufacturer can match

And in the case of the A.O.Smith Motor Man:

you get features like this:



SEALED STARTING SWITCH — Exclusive development . . . totally enclosed in end frame. Keeps foreign matter out, extends life of switch and motor.

DRIP-PROOF, WEATHER-PROTECTED CONSTRUCTION — suitable for applications formerly specifying splash-proof design. Fully protected even when ceiling or side wall mounted.

FOOL-PROOF LUBRICATION—Bearings can be greased but can't be over-greased. Construction features include inner shaft seal, self-cleaning action and large grease reservoir.

CONTROLLED THRU-VENTILATION — Cooling system designed for high-volume, low-velocity air to get maximum heat transfer . . . lower operating temperatures . . . longer insulation life.

OPTIONAL FRAME MOUNTINGS — There's no need to change product design to use NEMA frame sizes. A. O. Smith provides mountings drilled to both old and new specifications.

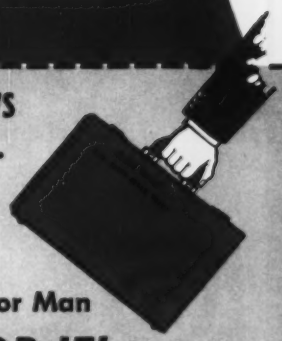
FULL-ROTATING CONDUIT BOX — Can be set at any angle. Designed to save motor space and speed installation. Loosen only three screws to rotate conduit box.

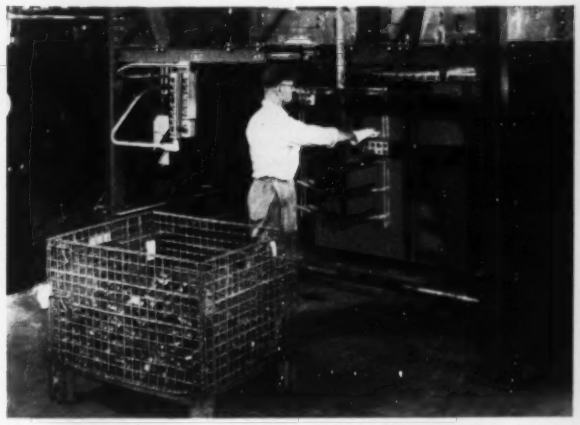
all yours . . . and more in America's 3rd great full-range motor line!

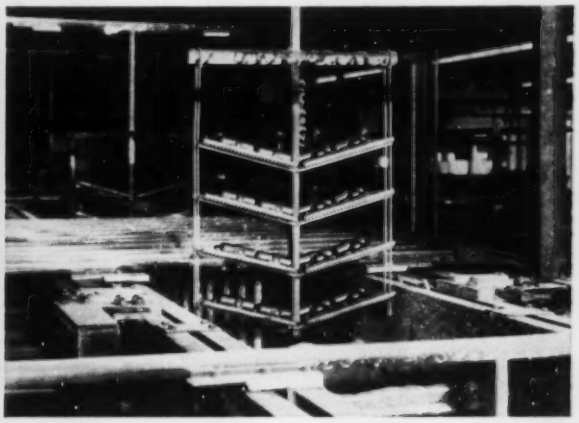
Through research . . . *a better way*

A.O.Smith
CORPORATION
ELECTRIC MOTORS
TIPP CITY, OHIO
A. O. Smith INTERNATIONAL S. A., Milwaukee 1, Wisconsin

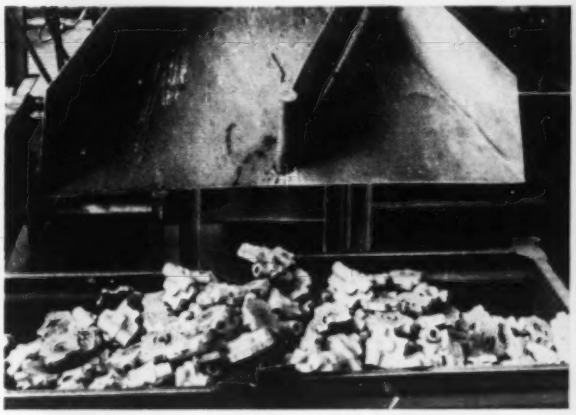
MORE BIG NEWS ON THE WAY...
direct to you from the case of the A. O. Smith Motor Man
WATCH FOR IT!

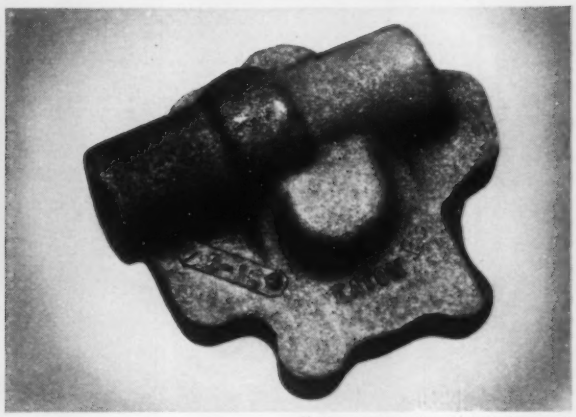






DIRTY CASTINGS COME CLEAN





*Photos, courtesy Ajax Electric Company**

CHEMICALLY CLEAN WITH VIRGO® ELECTROLYTIC SALT

How Eaton Manufacturing saves up to 75% on salt for desanding

A short dip in this new, fully mechanized furnace, and castings come up completely cleaned for the Eaton Manufacturing Company.

Inside the furnace is a new desanding salt—Virgo Electrolytic Salt—which costs as little as one-fourth as much as comparable electrolytic cleaners.

This molten salt takes just 15 to 20 minutes to clean even the hard clinging sand, scale, graphite, and other surface impurities from iron and steel castings.

Because of this speed, the new Eaton furnace can handle up to 5400 gross pounds of castings per hour, heating them to 900° F. with 274 KWH/Hr. One man operates the entire furnace.

No acid dip. The Virgo Electrolytic Salt process requires no acid dip after rinsing. Of course, if other operations require it, you *can* use the acid treatment.

The bath's electrolytic action leaves all casting surfaces resistant to rust, helps *keep* them clean until further processing.

Samples tested. We have a bath set up in the Hooker laboratories, so you can prove for yourself how Virgo Electrolytic Salt can clean your castings—*for less money*. Write us about submitting samples for such test cleaning.

For technical data on the salt and the process, send us the coupon.

*Designers and builders of mechanized furnace.

Check here for data on Virgo Electrolytic Salt and these other Hooker chemicals used for cleaning and treating metals:

- ☐ Virgo Electrolytic Salt
- ☐ Virgo Descaling Salt
- ☐ Virgo Molten Cleaner
- ☐ Caustic Soda
- ☐ Muriatic Acid
- ☐ NIALK® TRICHLORethylene

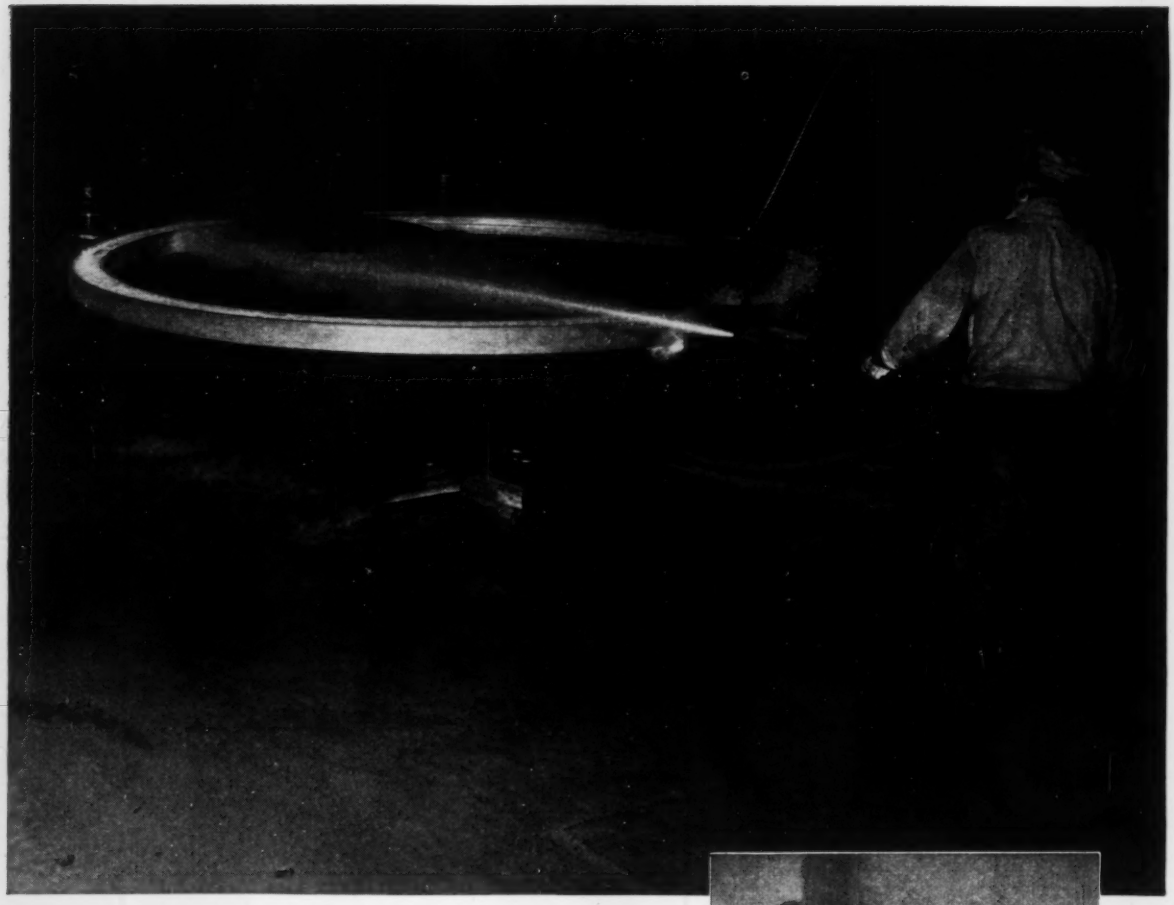
Clip and mail to us with your name, title and company address.

HOOKER CHEMICALS PLASTICS

HOOKER ELECTROCHEMICAL COMPANY

1211 UNION STREET, NIAGARA FALLS, N. Y.

NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES



"Your company will go all-out to give the best possible service"

These are the words of Fred O. Reedy, president of Kennedy-Van Saun Mfg. & Engineering Corporation, Danville, Pa. He was writing about two seamless steel rings his company required to complete a huge rotary cooler.

The larger of the two rings called for an outside diameter of 109½ in.; the other for one only slightly smaller. We forged them of special-analysis steel made in our own plant, rolled them to shape, quenched and tempered them for the right hardness and other physical characteristics—then finish-machined them to close tolerances—*and got them to our customer on time.*

The compliments from Mr. Reedy are among hundreds along the same lines in our files. We can be proud of the products we manufacture and the good service we provide—service we believe not many mills can match.

Write Dept. 2L today for the story on special-order rings, flanges and open-die forgings by Standard Steel.

"When our Purchasing Department explained the importance of this emergency job and stated how badly we needed these forged steel rings, you agreed to supply them in 2 weeks' time and your shipment was right on schedule."

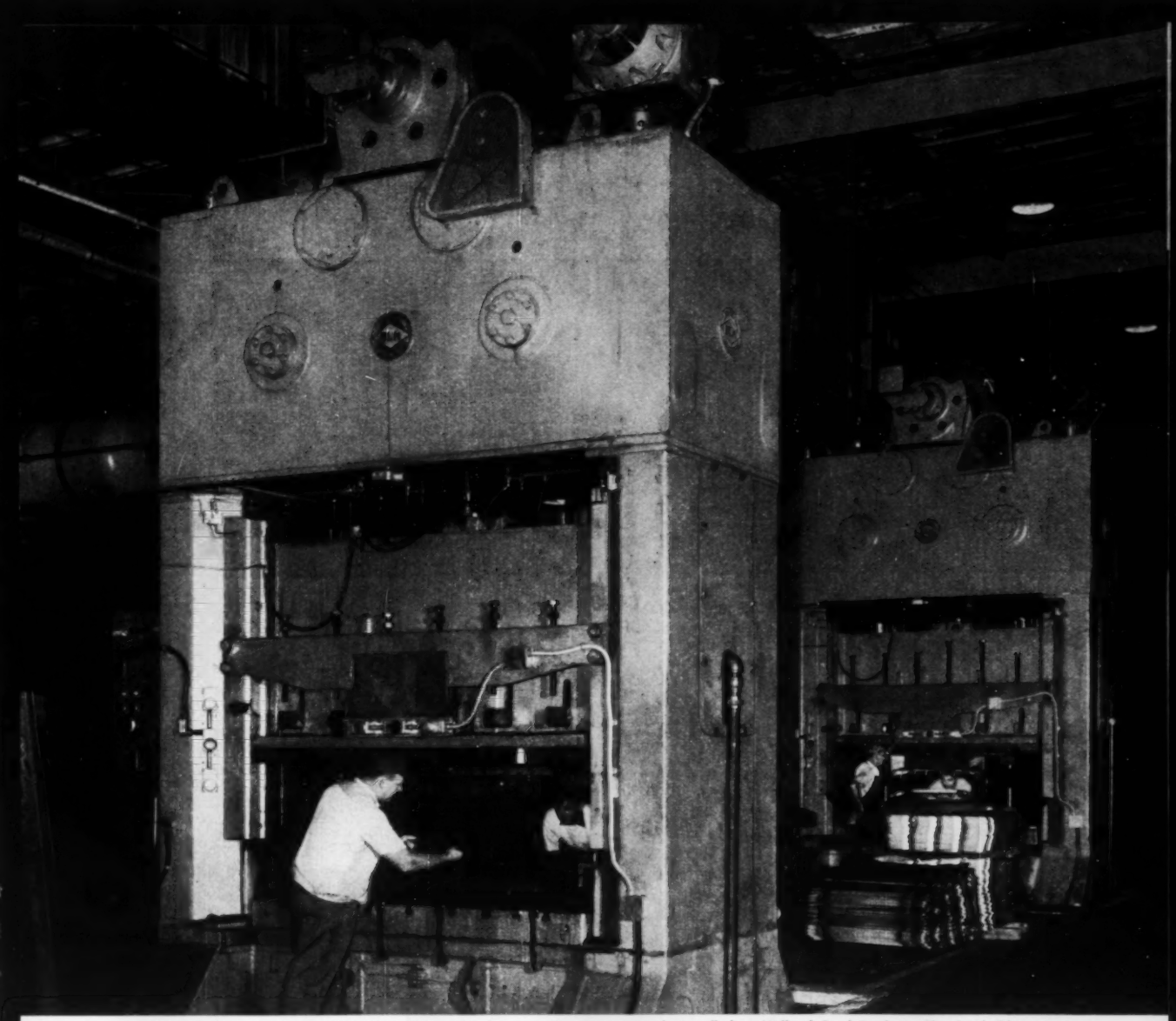
Standard Steel Works Division

BALDWIN · LIMA · HAMILTON

BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

BALDWIN BLH LIMA-HAMILTON



Pictured above are two new Hamilton 400-ton 2-point eccentric presses recently installed at Midland Steel Products, Cleveland, Ohio.

Versatility of Hamilton presses praised by Midland Steel Products

Four new Hamilton-built production presses were recently installed in the frame plant of Midland Steel Products, Cleveland, Ohio. Assistant to Plant Engineer Haldon R. Falquet describes these presses as "extremely versatile and flexible." Currently they are producing parts for 1958 model cars, but they are designed to accommodate the still larger parts now on the drawing boards for 1959 and 1960 models.

Mr. Falquet reports that in his experience there are numerous applications where Hamilton Presses "most often have proved satisfactory in meeting Midland's demands for the required tonnage, shut height, stroke and clearance between columns which enable us to meet our customers' specifications." One of the many Hamiltons in service at Midland is a 4000-ton press—the largest of its kind in the country—and turning out huge side rails for trucks and buses in a single hit.

Let us discuss your press problems with you. Perhaps our know-how in press building can save you money or improve your product—or both!

Hamilton Division Hamilton, Ohio

BALDWIN · LIMA · HAMILTON

Diesel engines • Mechanical and hydraulic presses • Can making machinery • Machine tools

BALDWIN BLH LIMA-HAMILTON

Lodge & Shipley POWERSHIFT PRESELECTOR...

the lathe head with a memory and a helping hand

GET PRODUCTION PLUS WITH THE LODGE & SHIPLEY POWERSHIFT PRESELECTOR

It's so easy . . . merely rotate cut speed dial to desired speed (computes the proper speed if required.) Then, when preset speed is needed . . . shift to it instantaneously at the apron!

SAVES TIME

Even a single change to the proper spindle speed can save important production time. A "compromise" speed setting may waste up to 50% of the machining time on one or more of a series of cuts.

GIVES INCREASED TOOL LIFE

Saving both time and money. Tools last longer and less time is wasted in changing and sharpening tools.

INSURES FINER FINISH

The right cutting speed means a better finish, resulting in greatly reduced or even no grinding . . . another important saving in time and cost.

CUTS OPERATOR ERROR

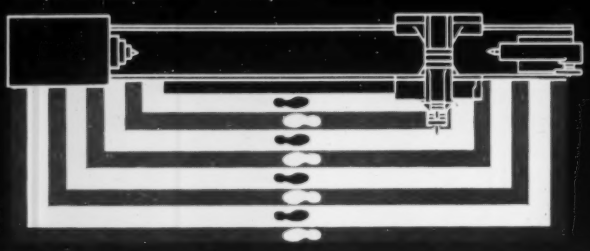
Preselection of cutting speeds saves operator effort and error. One speed can be preset; up to six others "programmed" with handy indicator tabs.

The Lodge & Shipley Powershift is operated by a simple, trouble-free electro-hydraulic system. It's safe, quick and positive . . . time after time . . . can be adapted for electronic programming or magnetic tape control for a full range of spindle speeds.

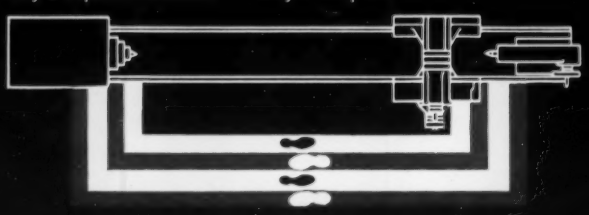
For detailed literature, write: **The Lodge & Shipley Co., 3070 Colerain Ave., Cincinnati 25, Ohio.**

With a long bed lathe and a job requiring 4 speed changes, an OPERATOR CAN SAVE ALMOST 50% OF HIS "HIKING TIME"

CONVENTIONAL HEADSTOCK . . .
4 trips to headstock . . . 4 to apron

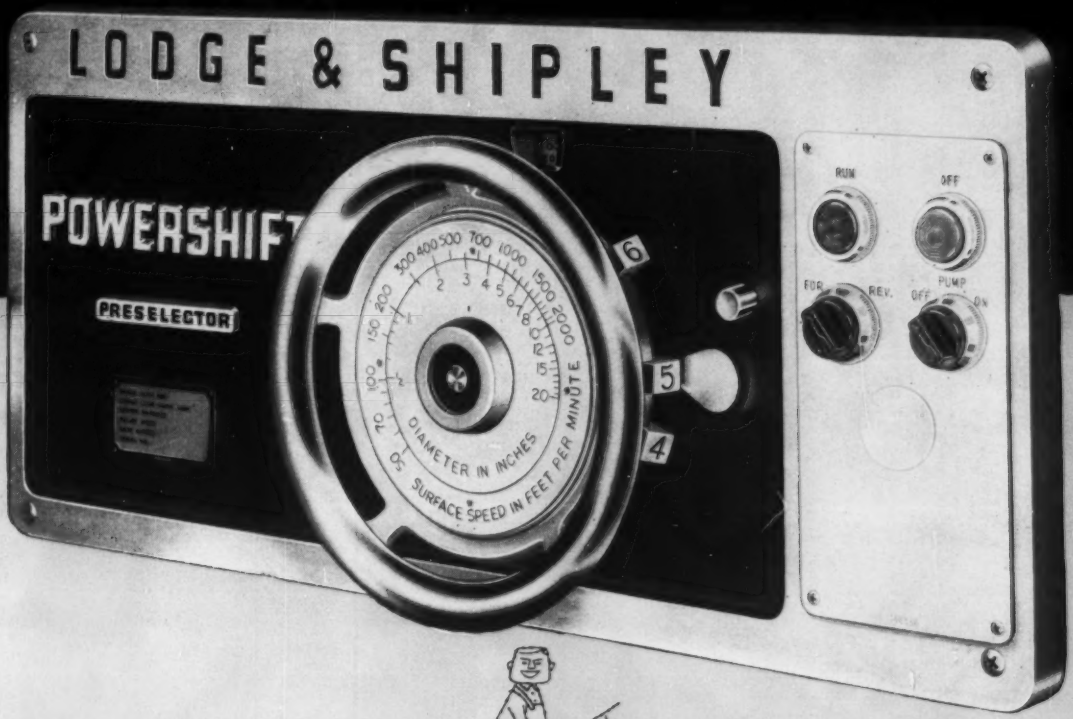


POWERSHIFT PRESELECTOR . . .
only 2 trips to headstock . . . only 2 to apron!



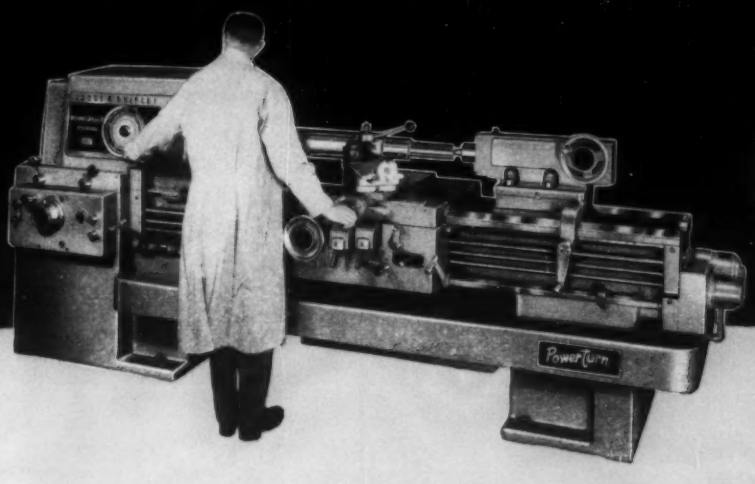
JUST **1** DIAL

computes! remembers! shifts!



steps up production

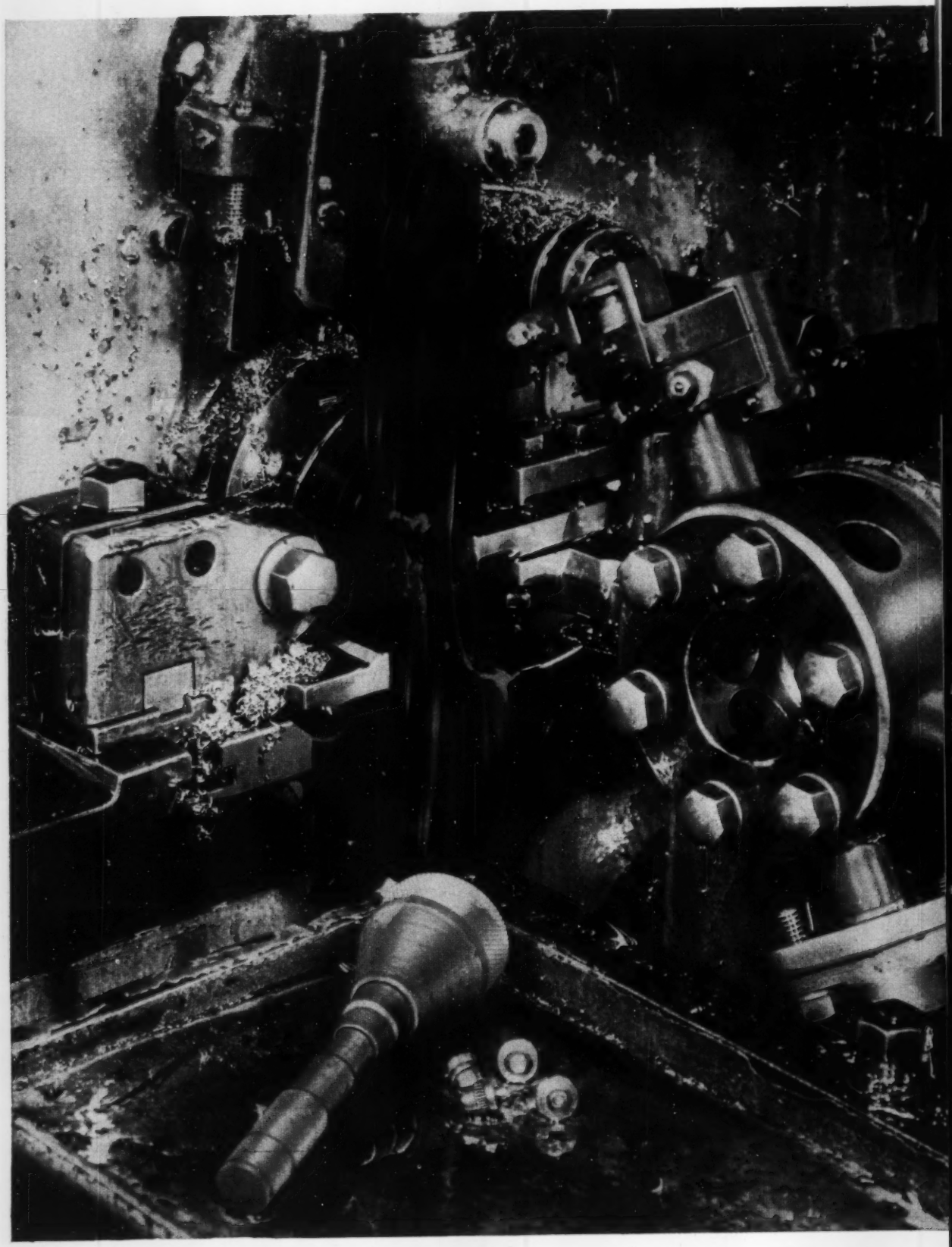
steps down costs



more than ever before

Lodge & Shipley

your LODGE-ical choice!



The tool is cutting steel, but the oil is cutting costs . . . because it's

GULFCUT!

Gulfcut 11D at work in J&L turret lathe at M&O Manufacturing Company, Wallingford, Connecticut.

This automatic screw machine uses Gulfcut, which contributes to longer tool life, finer finishes. Dictaphone Corporation has been using Gulfcut exclusively for the past 10 years.

It's Gulfcut 31C, to be exact—the sulfurized-mineral-lard cutting oil used at Dictaphone Corporation, Bridgeport, Connecticut. Mr. Joseph A. Maloney, Process Engineer, says: "We get steady production at an even rate, using Gulfcut—hold tolerances as close as 3 ten-thousandths—get the combination of lubrication and cooling that leads to longer tool life, better finishes, fewer rejects!"

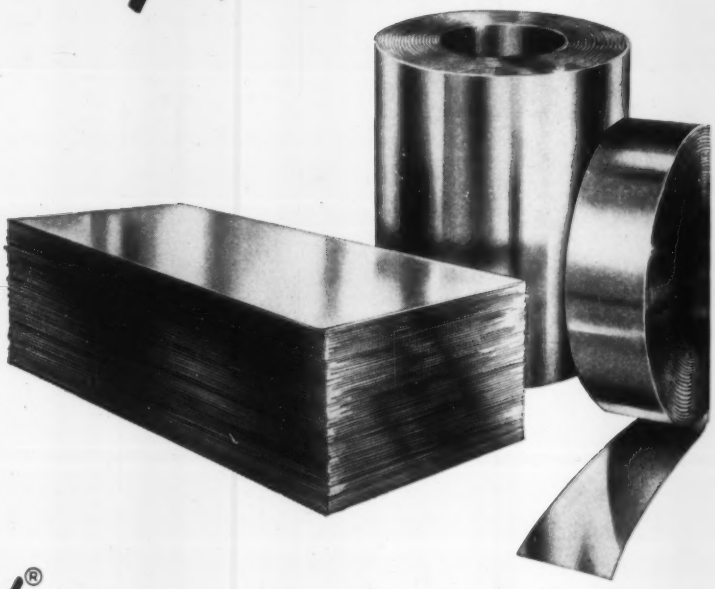
Dictaphone is only one of scores of companies that are trimming machining costs through the use of Gulfcut cutting oils. We think Gulfcut can improve your machining practice, too. In Gulf's complete line, there's a Gulfcut cutting oil for your every metal cutting need. Each is specifically compounded to meet specific requirements. Each is scientifically made to help you cut costs. And your Gulf Sales Engineer will gladly recommend the proper oils for you. Just contact your nearest Gulf office.

Gulf Oil Corporation
Dept. DM, Gulf Building
Pittsburgh 30, Pa.

GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

Wherever you are you get *quick personal service*



when you order *MicroRold*® Stainless Steel Sheet & Strip

SPECIFICATIONS

	WIDTH	THICKNESS
SHEETS	up to 36″	.005 to .109
	up to 48″	.010 to .109
STRIP	up to $23\frac{15}{16}$″	.0015 to .090
GRADES:	201, 202, 301, 302, 304, 305, 316, 321, 347, 403, 410, 430 and Micro-Mach (special extra-high-tensile aircraft grade)	

Any one of the 305 independent steel warehouse distributors stocking MicroRold Stainless Steel is ready to serve as your *personal* stainless procurement representative. Located strategically in the U. S. A., Canada and Europe, your MicroRold distributor carries a variety of grades, widths, thicknesses and finishes and is fully qualified to assist you in the selection and fabrication of the most suitable stainless grade for your particular requirements.

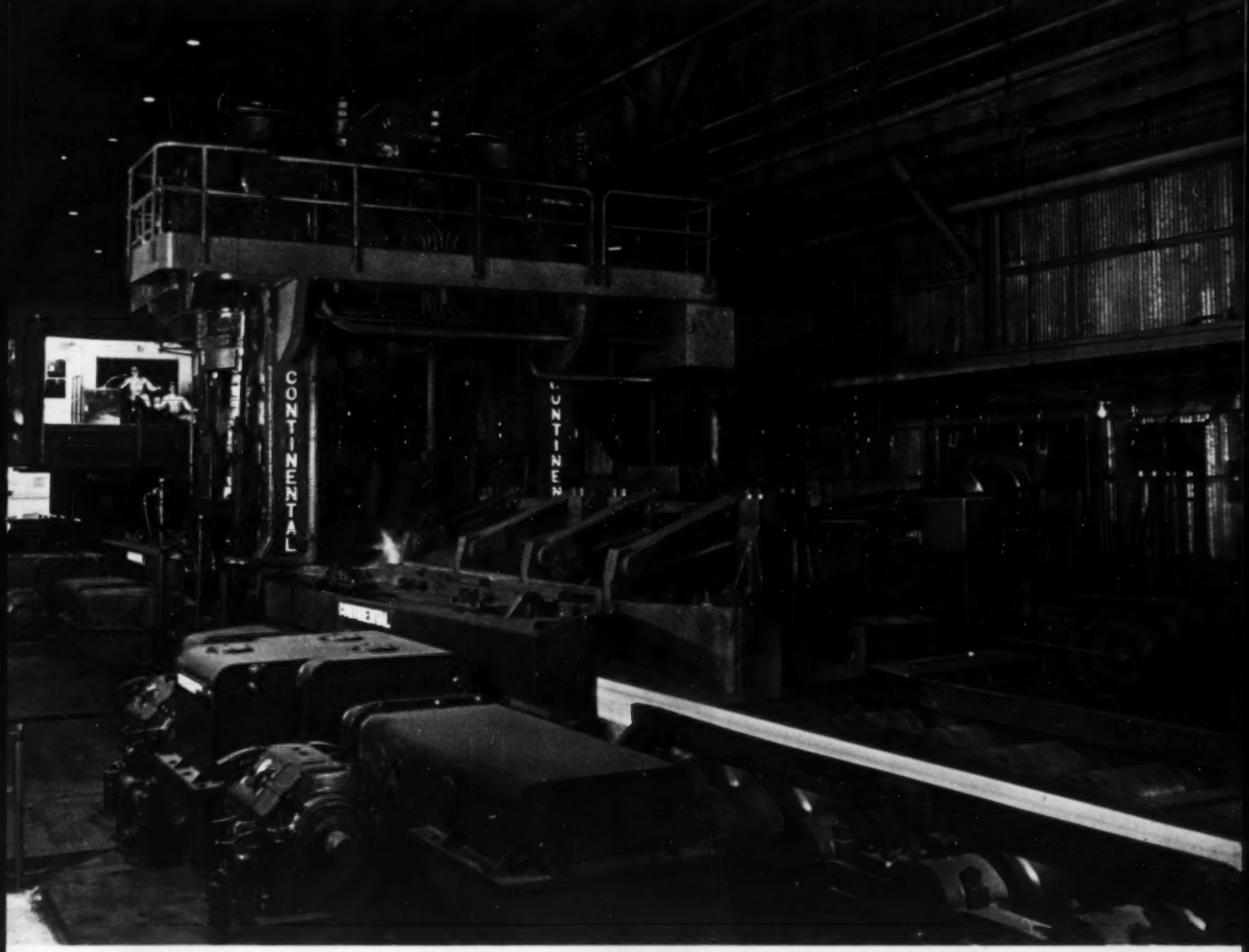
Your MicroRold stainless steel distributor assures you of the fastest possible deliveries with an absolute minimum of red tape in order processing. If he is unable to fulfill your needs from stock he has available direct and immediate service from our mill. In cases of emergency, it is possible for us to roll and ship MicroRold Stainless Steel the same day the order is received.

You can rely on MicroRold service as a dependable source of supply, either mill or distributor delivery.

Write, wire or phone today for the name of your nearest MicroRold Stainless Steel Distributor.

WASHINGTON STEEL CORPORATION

112-0 WOODLAND AVENUE WASHINGTON, PENNSYLVANIA



40 x 96 inch, 2-high blooming mill at the Fairless Works of the United States Steel Corporation, designed and built by Blaw-Knox.

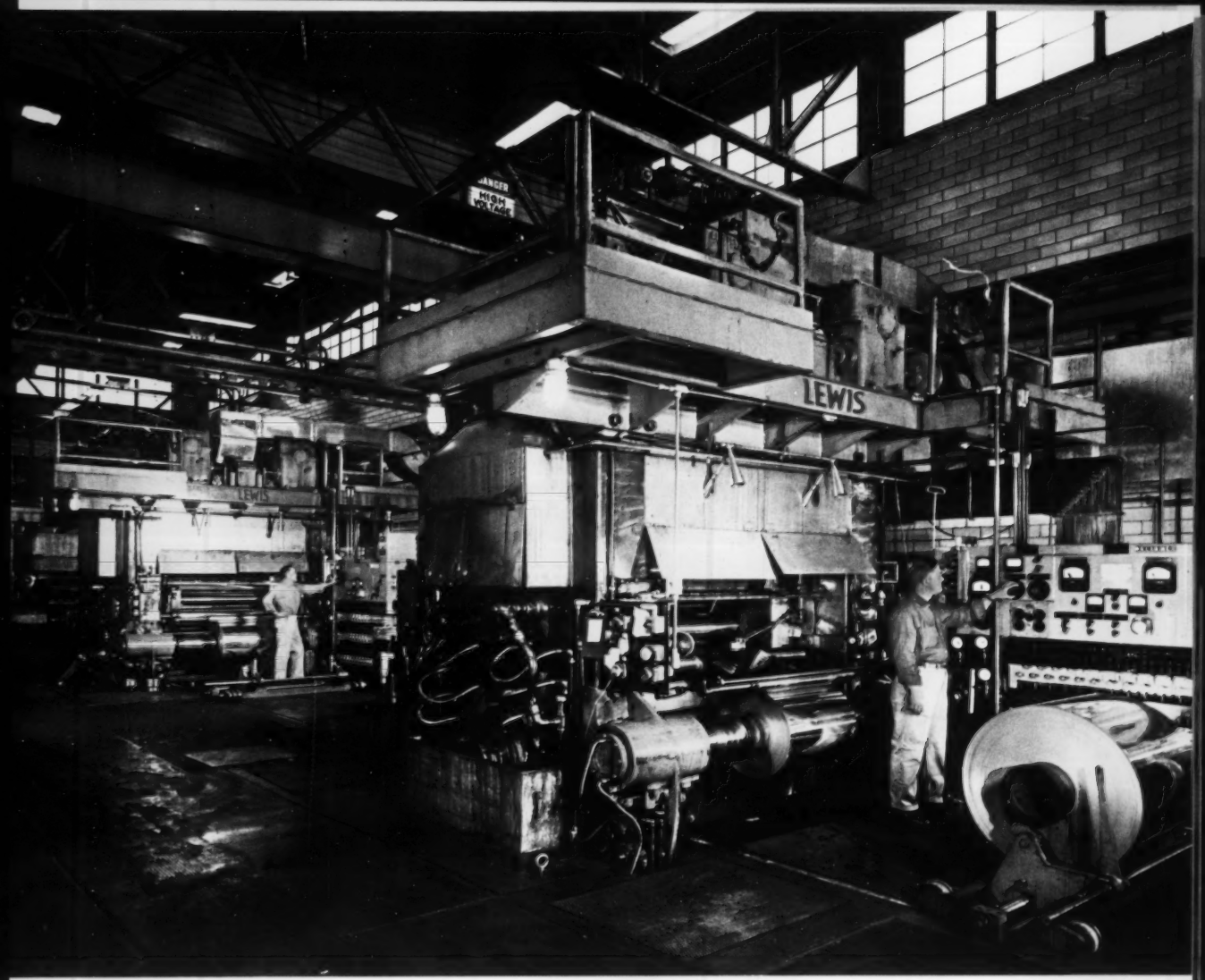
BLAW-KNOX
BLOOMING MILLS

Blaw-Knox designs and builds slabbing-blooming mills in a complete range of sizes in high-lift and universal types. Other Blaw-Knox designed equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron and steel rolls, Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or composite design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

BLAW-KNOX

BLAW-KNOX COMPANY

Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania



10 and 31 x 62-inch 4 high mill at
Cochran Foil Company, Louisville, Kentucky.

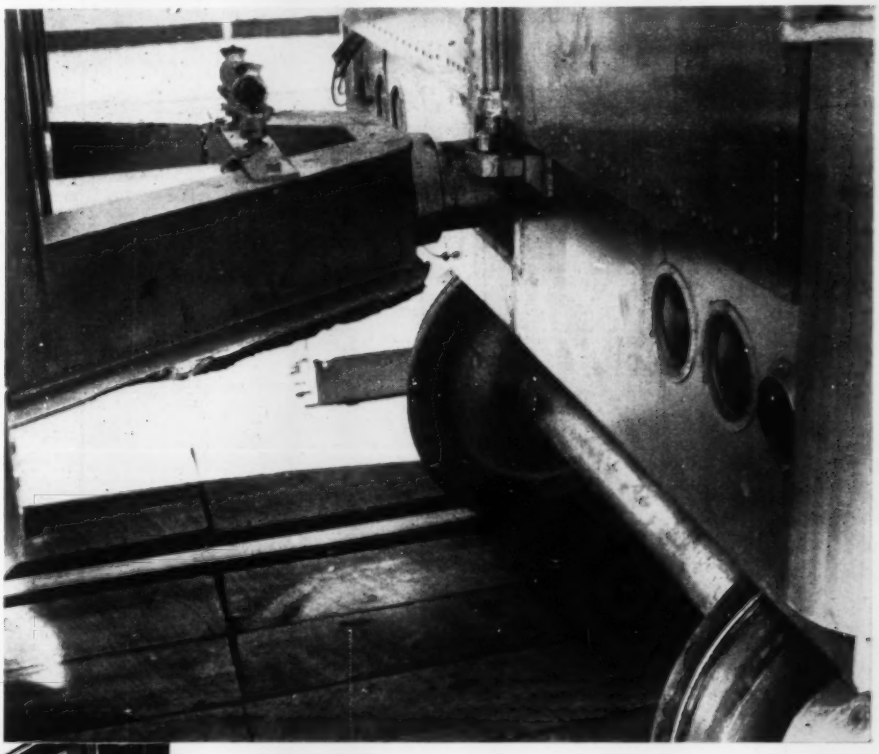
BLAW-KNOX
ALUMINUM FOIL MILLS

Blaw-Knox designs and builds a full range of Aluminum foil mills complete with auxiliary equipment to meet individual requirements. Other Blaw-Knox equipment for metals industry includes complete rolling mill installations including all auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron and steel rolls, Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

BLAW-KNOX

BLAW-KNOX COMPANY

Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania



Yoloy "E" high strength-low alloy steel provides required strength with less weight to the Railvan's underframing. Coupled view is shown at right.

C & O's new Railvans shown below — with combination highway and railroad wheels mounted on a single spring suspension system — operate either on the highway or railroad tracks.

C & O USES YOLOY "E" IN "FIRST" RAILVAN

Chesapeake and Ohio's new Railvan utilizes truck trailers that operate either as long trains on railroad tracks or as single units on highways. Such equipment employs a unique combination of railroad and highway wheels mounted on a single spring suspension system.

Hot Rolled Yoloy "E" Sheets and Plates—fabricated by Binkley Manufacturing Co. and Visioneering Company of Cleveland—form the rugged underframe required for railroad rolling stock. The tubular center sill was produced from 5½" A.P.I. Drill Pipe.

Youngstown's family of Yoloy steels are produced to meet a wide range of applications, where high strength and corrosion resistance are of prime importance. Call us today for a Youngstown Service Engineer to discuss your problem. Free Yoloy literature is available.

QUALITY YOUNGSTOWN SERVICE

Write for these free pamphlets in The Yoloy Family series:

YOLOY "E"
High Strength Low Alloy Steel—standard applications

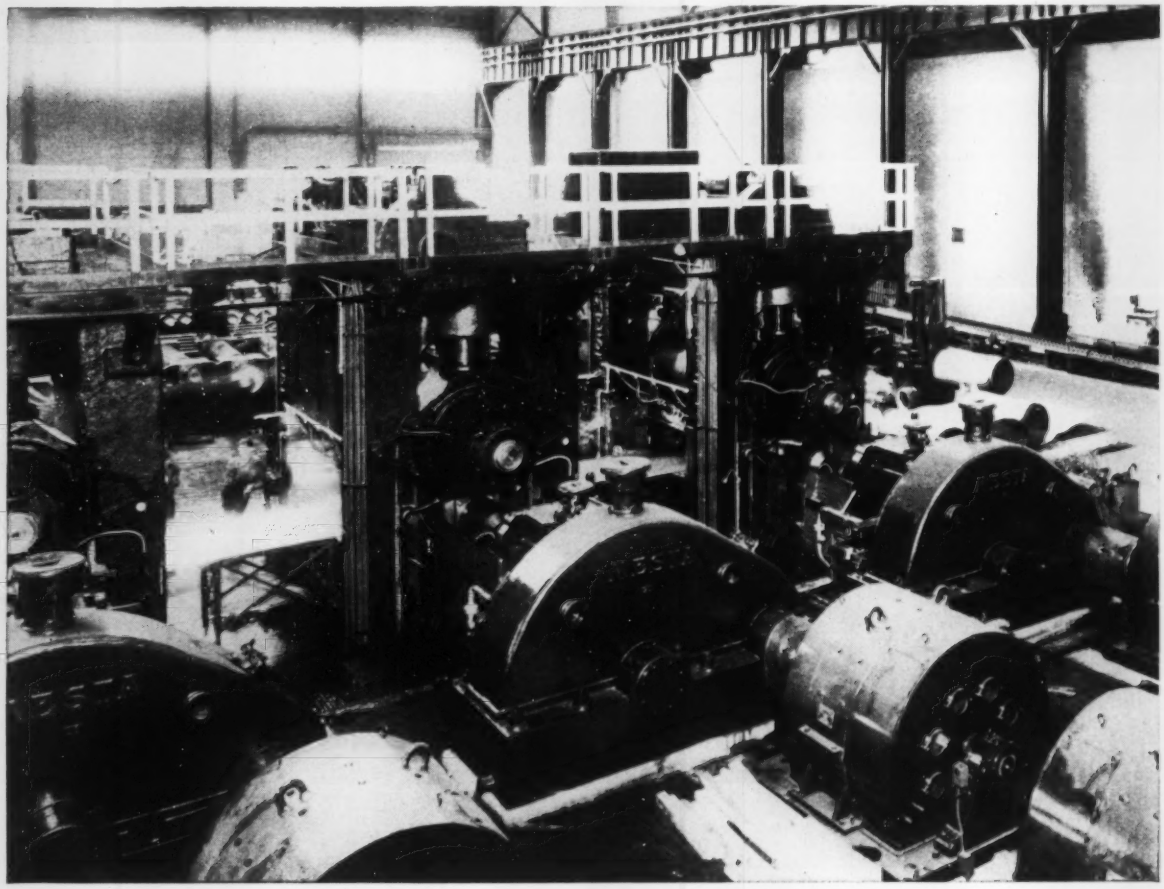
YOLOY
High Strength Low Alloy Steel—special applications

YOLOY "S"
Higher Strength Steel for increased service life

YOLOY "C"
Corrosion Resistant Grade for deep forming

YOLOY PIPE
Continuous Weld for corrosion resistant applications

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities



PROTECT REDUCTION GEARS
against Heaviest Loads

It's the polar additives in *Texaco Meropa Lubricant* that *keep* it clinging to gear teeth and bearing surfaces even when gears are working under severe conditions of heat, pressure, or moisture.

What's more, the extreme pressure properties of *Texaco Meropa* give it a tougher, longer lasting lubricating film that effectively protects against shock or heavy steady loads. And it resists oxidation and thickening—won't foam or separate. All good reasons why gears run smoother, last longer, and maintenance costs stay low.

There is a complete line of Texaco Lubricants designed to help you get the most efficient performance from your equipment. A Texaco Lubrication Engineer will be glad to suggest those best suited to your needs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

STEEL
November 25, 1957

Metalworking Outlook

Congress and Defense

The Congressional temper on defense spending is still largely moderate—close to the administration's stand. True, Sen. Henry Jackson (D., Wash.), a naval and missile booster, demands that we build 100 atomic submarines capable of firing the 1500-mile Polaris (total cost, $5 billion). But Sen. Lyndon Johnson (D., Tex.), whose committee begins investigating our missile and satellite projects today (Nov. 25), has yet to call for such spending. Nor has Sen. John McClellan (D., Ark.), whose opinions will influence southern Democrats. Sen. Styles Bridges (R., N. H.), economy bloc leader, thinks the new defense look might cost $1 billion to $2 billion over fiscal 1958's program of $38.4 billion.

Production of Both Jupiter and Thor?

Defense Secretary Neil McElroy does not rule out the possibility of putting both the Jupiter and Thor intermediate range ballistic missiles into production at the same time. With Douglas Aircraft Co. Inc. reportedly tooled up to make the Thor, a Chrysler Corp. official comments: "We have always proceeded on the theory that the Jupiter would go into production." The plan to ship IRBMs to our allies by mid-1959 will probably not directly affect Pentagon budget plans because we have long been prepared to spend over $3 billion on missile procurement in fiscal 1959. Additional testing money, however, will be needed to get our IRBMs ready for production.

Answer to the Sputnik?

Kodiak Corp., a small Cleveland manufacturer of aircraft tools, fixtures, and gages, "may well have the answer to Russia's sputnik challenge," says Brig. Gen. W. A. Betts, first assistant to the secretary of Defense for Air Force missiles. Kodiak's "answer": Welded rectangular rocket tubes, described as lighter, stronger, and more efficient than conventional round tubes.

Railroads To Seek Another Rate Hike

Look for the nation's railroads to soon ask the Interstate Commerce Commission for another freight rate boost—this one on selected items. Most metalworking products, however, would be included. The move comes because of shrinking railroad profits and the likelihood of freight volume in 1958 being somewhat lower than this year's. The profit problem also spurs merger talk, the latest involving the New York Central and Pennsylvania. Far closer to fruition than that deal is the joining of the Erie, the Lackawanna, and the Delaware & Hudson Railroads. When the final consolidation occurs, the Nickel Plate may even be involved.

GNP To Drop 1 Per Cent Next Year

Gross national product will drop 1 per cent next year from 1957's $435 billion, predicts Commerce Secretary Sinclair Weeks. Profit levels will

Technical Outlook—Page 91 Market Outlook—Page 127

continue to shrink next year, he believes, although less severely than they have in the last few years. That's because inflation will be less serious next year than this. Some 75 per cent of the GNP increase this year is accounted for by rising prices.

Money Managers Act

Federal monetary managers think the danger of inflation has lessened, as evidenced by the lowering of the rediscount rate from 3½ to 3 per cent by some Federal Reserve Banks (see Page 57). The actions should make money a trifle more available, welcome news to many a metalworking company. But don't be too enthusiastic; money is still tight.

Net Income of 810 Firms

Net income after taxes for 810 companies hit about $2.8 billion for the third quarter, a drop of 11 per cent from the preceding period but an increase of 11 per cent over 1956's third quarter. The First National City Bank of New York reports that the favorable comparisons with a year ago were due in part to 1956's third quarter strikes.

New Steel Plant Planned in Florida

Florida Steel Corp. plans to build an electric steel furnace and rolling mill with a capacity of 25,000 to 30,000 tons a year in the Tampa, Fla., area. Total cost: About $1,250,000. Major product: Reinforcing bars. Completion is scheduled for next summer.

Automation Changes the Labor Force

Automation is contributing to changes in the structure of the labor force, says the National Industrial Conference Board. Its survey of 130 companies shows: The proportion of workers engaged in direct production labor has declined during the last three years. The proportion of workers in the factory indirect labor force, such as maintenance, production control, and industrial security personnel, also has dipped since 1954. The shifts in the labor force are accompanied by proportionate increases in nonfactory employment, such as head office, clerical, and sales personnel.

Straws in the Wind

The FRB industrial production index slipped 2 points from September to reach 142 per cent of the 1947-49 average in October . . . J. I. Case Co.'s new line includes 12 tractor models featuring automatic transmissions and more than 300 farm machinery units . . . The first primary aluminum has been poured at Kaiser Aluminum & Chemical Corp.'s new Ravenswood, W. Va., plant . . . Warner & Swasey Co. is introducing a wire weaving machine to produce insect screening at speeds four to six times conventional rates; it's based on operating principles of the company's textile looms . . . Ben Fairless told the Youngstown Chamber of Commerce that he sees no "deep depression" ahead.

WHAT ARE YOU SHOVELING THAT STUFF IN THE FURNACE FOR, FELLAH ?
BECAUSE THE GUY IN FRONT OF ME IS !
THANKS TO
L.C. SVETE
ASS'T. O.H. SUPT.
NATIONAL TUBE CO.
LORAIN, OHIO
HUEKES

Follow The Leader

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

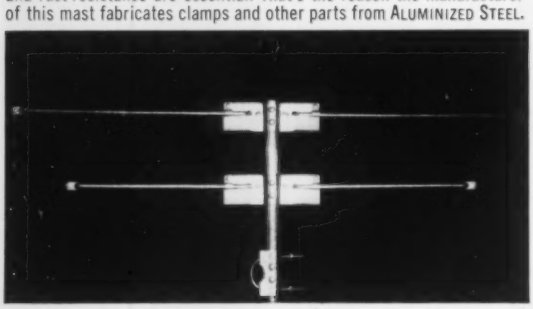
BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

Give Outdoor Products Long Life at Low Cost with Armco ALUMINIZED STEEL Type 2

High temperature vessels, like this one at a Texas refinery, are protected **and insulated** by ALUMINIZED STEEL Type 2. Units are shielded from weather by casings made of ALUMINIZED STEEL. In addition, this aluminum-coated special steel provides insulation by reflecting heat.

At Rockaways' Playland, New York, rolling doors of ALUMINIZED STEEL eliminate yearly painting—give better service than any doors used before. In fact, plans call for eventual replacement of all rolling doors with durable doors of Armco ALUMINIZED STEEL Type 2.

TV antennas take the full brunt of wind and weather. High strength and rust-resistance are essential. That's the reason the manufacturer of this mast fabricates clamps and other parts from ALUMINIZED STEEL.



Special hot-dip aluminum coating seals out atmospheric corrosion—assures durability—keeps maintenance low

More and more outdoor products now provide much longer service life at low cost because of the unique combination of advantages offered by Armco ALUMINIZED STEEL® Type 2.

Atmospheric corrosion resistance is its major benefit. 18-year tests of unpainted samples in a mild industrial atmosphere show life of the aluminum coating on ALUMINIZED STEEL Type 2 is *at least 3 times* that of a commercial zinc coating on galvanized steel sheets.

What's more, this sturdy steel reflects heat like aluminum. Its attractive, bright finish *needs no paint.* It offers real economy when compared strength-for-strength or thickness-for-thickness with aluminum.

GET COMPLETE DATA

It may pay you to investigate the advantages of this new aluminum-coated steel for *your* outdoor products. Just fill in and mail the coupon or call the nearest Armco Sales Office.

ARMCO STEEL CORPORATION
2167 Curtis Street, Middletown, Ohio

Send me complete data about Armco ALUMINIZED STEEL Type 2.

We make_____

Name_____

Firm_____

Street_____

City_____ Zone____ State_____

ARMCO STEEL CORPORATION

2167 Curtis Street, Middletown, Ohio • Sheffield Steel Division • Armco Drainage & Metal Products, Inc. • The Armco International Corporation

The Left Hand Knoweth Not!

A year and a half ago we raised the question about the Federal Reserve Board's policies on credit ("Credit Too Tight?" May 28, 1956).

In four successive jumps, beginning on Apr. 15, 1955, the Fed had raised the discount rate from 1½ to 3 per cent on money it advances to banks.

In turn, member banks had to increase the interest rates charged on business loans.

A leading banker pointed out that higher rates eventually would dampen industry's building and expansion plans.

General Motors' Harlow Curtice blamed the Fed's credit policies for the dip in auto sales and said business might decline if it did not reverse its policies.

The National Association of Real Estate Boards predicted mortgage loan rates would rise to 6 per cent.

George M. Humphrey, then secretary of the treasury, said he would not have made the last hike (¼ point) in the rate.

Even though evidence was accumulating in 1956 that the Fed had pulled the noose too tight on legitimate expansion of credit, it went on to boost the rate to 3½ per cent last August.

Until Nov. 15, spokesmen for the Fed were still talking about the evils of inflation. On that date, and without warning, it reversed itself by cutting the rate to 3 per cent . . . in recognition of the economic downturn!

The move caught the U. S. Treasury flat-footed at a time it was about to arrange a $10 billion refinancing program based on the 3½ per cent rate. Top Department of Commerce people did not hear about the change until hours after it was announced.

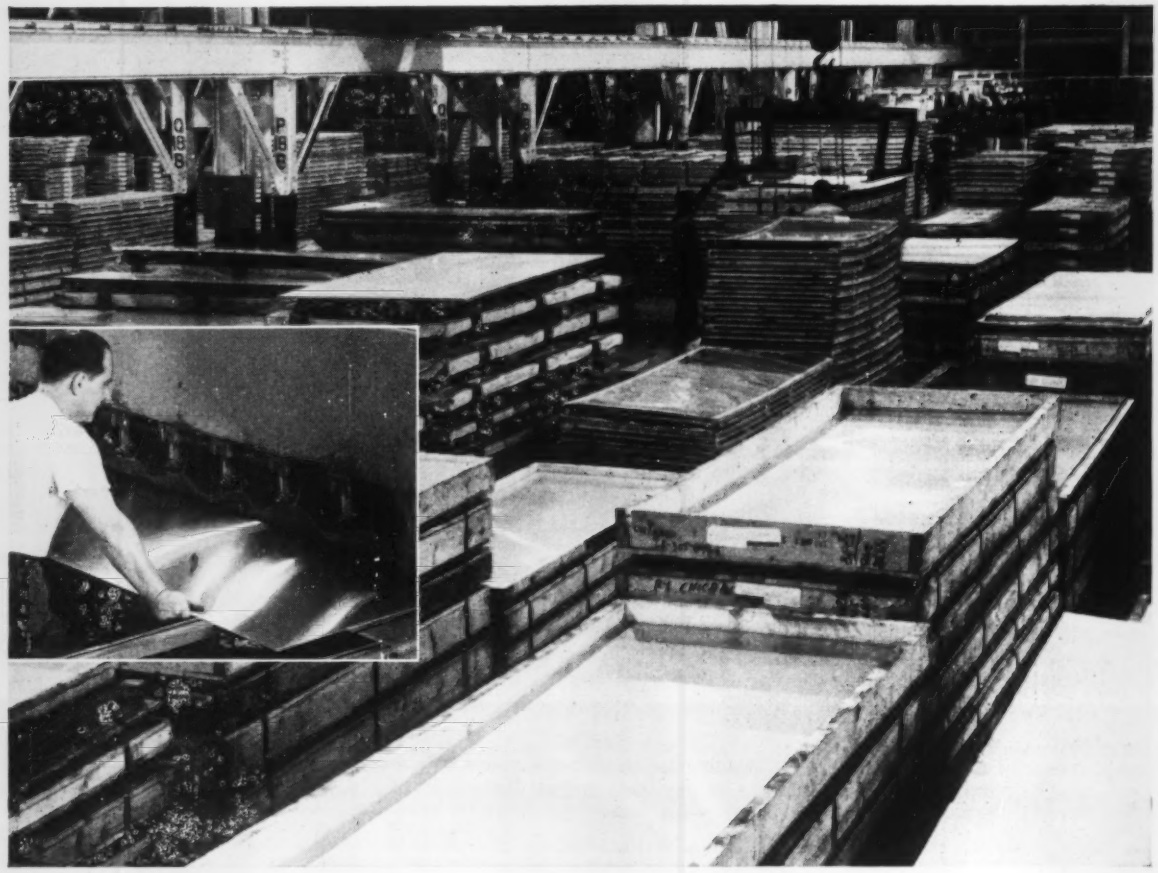
As in the case of the missile program and so many other government activities, the left hand knew not what the right hand was doing.

We firmly believe there should be better co-ordination and communication between government agencies in making decisions so intimately concerned with the national welfare.

The solution lies in the adoption of legislation (including S. 3230 on fiscal policy) resulting from the recommendations of the Second Hoover Commission which are gathering dust in Senate and House committees.

The way to get action is to express your views to your senators and congressmen. We hope you will!

Irwin H. Such
EDITOR-IN-CHIEF



Why do more stainless buyers call Ryerson?

There are four main reasons:

First, the nation's largest stocks of Allegheny stainless are always on hand at Ryerson—2351 types, shapes, sizes and finishes . . . tons of sheets, plates, bars, angles, pipe, tubing and fittings.

Second, Ryerson knows stainless. As the pioneer supplier of stainless from stock, Ryerson has worked with more stainless users, helped more firms to use the right type to the best advantage. This experience is always available to present and future users.

Third is the equipment for cutting stainless to your specifications. The most modern shears, saws, and flame-cutting machines produce accurate sizes and shapes, in any quantity.

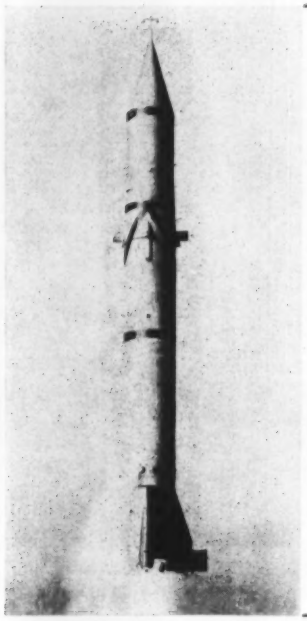
And fourth is Ryerson's ability to deliver any requirement, any quantity—on time.

When you need stainless, or help on stainless problems—call your nearby Ryerson plant.

RYERSON STEEL

Principal Products: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing—aluminum, industrial plastics, metalworking machinery, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • INDIANAPOLIS • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE



Chrysler Corp.

Ike's Plan: To Hold Budget Line on Defense Spending

(Billions spent in fiscal years)

	1953	1954	1955	1956	1957	1958
Personnel	$11.6	$11.0	$10.6	$10.7	$10.4	$10.3
Operation & maintenance	10.4	9.4	7.9	8.5	9.4	9.5
Major procurement & production	17.1	16.0	13.0	12.2	13.6	13.1
Construction, research & development, and other spending	4.6	4.1	4.0	4.4	5.0	5.1
Total, Defense Department	43.6	40.3	35.5	35.8	38.4	38.0*
Mutual security	5.4	4.6	3.8	3.8	3.5	3.2
Atomic Energy Commission	1.8	1.9	1.9	1.7	2.0	2.3
Stockpiling & defense production expansion	1.0	1.0	0.9	0.6	0.5	0.6
Grand total, all national security spending	51.8	47.9	42.1	41.8	44.3	44.1*

Source: Bureau of the Budget.
*Estimated for fiscal 1958 spending by the Defense Department has, since sputnik, been unofficially revised to $38.4 billion. The total for all national security spending in the year will be $44.5 billion.

Manhattan Plan for Space

A project modeled after the one which developed the atom bomb is planned to find weapons superior to the missile. It may prove the most important of all postsputnik developments

WITHIN A MONTH, President Eisenhower will direct Defense Secretary Neil McElroy to appoint a single manager of special space projects.

Of all the postsputnik developments brewing in Washington, it may be the most important. Envisioned is a program like the Manhattan project for the atom bomb.

Spaceman's Job—The emphasis on space projects leads some Pentagon observers to believe a decision has been reached to develop fantastic new weapons before our missile programs come to fruition. Mr. McElroy describes the new space manager's job as covering antimissile missiles (combining the Air Force and Army programs), certain "upstream" projects, and all satellites not now included in the International Geophysical Year projects (Vanguard and Jupiter C). It's undecided whether the space manager will be a civilian or serviceman.

The space manager concept caught many congressmen and Washingtonians by surprise. The Pentagon is virtually saying that missiles are already outdated. By concentrating on the few that we have in the development stage, we'll stay even with the Russians; meanwhile, we'll be developing Mr. McElroy's "upstream" weapons to once again put us ahead in the arms race. ("Upstream" is the Pentagon's catchword for weapons beyond the missiles.)

Missile Czar—William Holaday, as director of guided missiles in the Defense Department, will be restricted to those "birds" already in the development stage. He will merely advise the services as an assistant to the Defense secretary.

Certainly missiles will be a major program, but they'll not be given the crash treatment. The planned growth revealed last month (STEEL, Oct. 7, p. 119) calls for spending of about $5.5 billion by fiscal 1961, double the amount this year. One reason for no crash program: We don't have many big production missiles to build. The President's reference in his Oklahoma City speech to a "considerable figure" in additional costs for security was first understood to be additional billions for missile hardware. It turns out he meant additional millions for research and development, missile testing, dispersal of the Strategic Air Command, and better warning devices.

Science Czar—Dr. James Killian's job as special science adviser will remain advisory. He's charged with keeping the President up to date on technical developments.

SAC's Job — Virtually on the doorstep of space, the Pentagon

continues to indirectly downgrade SAC's future role. Asked if missiles couldn't operate faster and more efficiently than the highly publicized SAC run to Buenos Aires last week, Gen. Curtis LeMay, vice chief of staff of the Air Force, said a "second generation" of missiles, to be available in three to four years, could do the job better.

If a second generation is planned immediately, it looks as if high production of first generation missiles (which we're now dealing with) may never come about— another reason why we're not ready to substantially boost missile spending immediately.

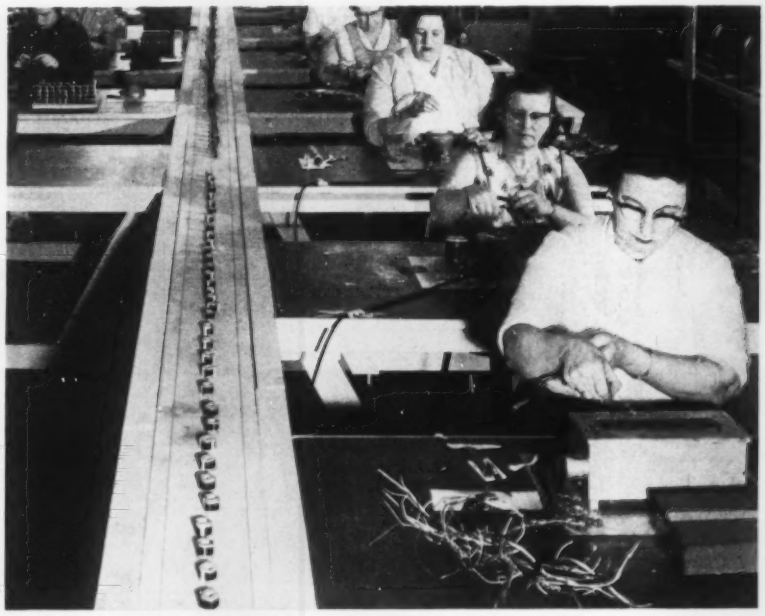
Congressional Reaction — The chance that Congress may take the ball from Ike and demand billions now is still a possibility. Unless the administration convinces the public that we can catch the Russians in terms of science and weapons that outdo missiles, Congress could bull through a greatly increased budget for fiscal 1959.

The administration's program is set forth in the table on Page 59. President Eisenhower wants the added millions needed immediately to come from other places in the budget. A top Pentagon financial man believes Defense can save about $500 million in revised personnel policies. The mothballing of some ships will help, too. Nondefense cuts may bring savings. The space project should result in savings by combining antimissle missle programs.

Budget Problems — Although such economies will be difficult, a high Treasury official denies any plans for unbalancing the budget or any proposals for lifting the debt ceiling of $275 billion.

Washington observers guess the Defense budget will be between $39 billion and $40 billion for fiscal 1959, compared with expected spending of $38.4 billion in fiscal 1958. The increase will go for the space project, more missile testing, and advanced research and development programs.

One of the administration's major arguments for budget moderation, as expressed by a naval research man: "To spend billions is no solution to our defense problem. It takes knowledge."



Stromberg-Carlson Div., General Dynamics Corp.

Workers such as these manufacture small transformers on assembly lines

Unbridled Electronics

Booming industry does not have personnel or capacity to fill civilian as well as military potential; defense is now taking 50 per cent and is on the rise

MILITARY sales will account for 60 per cent of the electronic industry's volume by 1960, compared with 50 per cent now (see table).

But even without defense spending, the industry would be booming. A shortage of personnel and capacity prevent it from taking full advantage of all civilian possibilities.

Example — The electronic computer business (heavily civilian) will total $500 million in 1958, says ElectroData Div. of Burroughs Corp., Pasadena, Calif. The market for such equipment is estimated at $3 billion to $10 billion, "and the demand is here now," says ElectroData.

Decreased defense sales would let the electronic industry satisfy such markets, but the military need for electronics in missiles is rising sharply. Even if the Defense budget stays at a consistent $39 billion to $40 billion annually for the next several years, the amount for missiles will climb steadily and should equal at least $5.5 billion by fiscal 1961, double the present rate.

Other U. S. Business—Defense sales aren't the only form of government business: The Civil Aeronautics Administration recently announced the largest electronic contract of its history, an $11-million order for beacons and control equipment (VORTAC) to Federal Telephone & Radio Co., a division of International Telephone & Telegraph Corp.

Emphasis on Civil — Forward looking firms in the industry, even those receiving huge missile contracts, continue to take a dim view of long term emphasis on military sales. The electronic industry is determined not to be dependent upon Defense Department shifts the way the aircraft industry is.

One of the largest eastern firms expects the Manhattan-type project for advanced space weapons (see Page 59) to blossom—but not as soon as many would like. In the meantime, it looks for civilian sales to stabilize its growth pattern.

A Pittsburgh area firm concentrates on control systems. Says the president: "Our emphasis is on the industrial control market. We can't build for the future if we supply only military users." His firm's sales are 60 per cent industrial, 40 per cent military.

Automation Promises—A Cleveland company has about the same ratio. It believes the biggest potential market for electronic equipment is automation. Still mechanical to a large degree, automation will become increasingly electronic as more complex production lines are built.

Transistors Boom — Motorola Inc., Chicago, estimates it produced one-twelfth of the transistor sales in 1956, the first year it got into the field. It was a profitless affair last year, but "fine profit opportunities are ahead in 1958," says Robert Galvin, president.

Outlook for 1958—Motorola expects a 10 per cent hike in sales of two-way radio and microwave equipment. Better solutions to flow problems in the oil and chemical industries will help make the improvement factor in 1957-58 as big as it was in 1956-57, says Brush Electronics Co. Div. of Clevite Corp., Cleveland. A Pittsburgh outfit looks for a 40 per cent boost in sales next year, as industry recognizes the need for better quality control in a year which may show sales leveling out. Without a big help from Uncle Sam, another eastern company feels 1958 will be "good, but not record shattering."

Electronic Industries Association, Washington, comments on the expected capital goods dip in 1958: "It will affect electronics less than any other industry. If business is generally down, some segments of the industry could be affected."

Long Range Future—Electronics remains the industry in which a unique idea can start a business on a shoestring, but the trend is toward a more mature type of growth, experts agree. Less new firms came into being in 1957 than in 1956.

EIA notes that about two-thirds of its members are classified as small business by government procurement standards (500 employees or less). Its 368 companies control about 92 per cent of the dollar volume of the industry, while about 3450 firms have the other 8 per cent. In the EIA, the average firm operates 3.75 plants.

Mergers are tending to drop off, indicate several sources, but this "maturing phase" is not over, says an Easterner. The thing to remember about electronics: Most big firms took on electronics as a sideline in the postwar boom, and they remain big in other fields today.

Case History — Magnetics Inc., Butler, Pa., shows a growth pattern fairly typical of the independent:

Year	Net Sales	Number of Customers
1950	$14,600	7
1952	409,000	75
1954	1,859,800	285
1956	3,001,300	800

President Art Black's first order was for $64. He estimates 1957's sales of magnetic components and amplifiers at $5 million.

The field is still good for small producers, believes a Midwesterner, because small orders dominate his business, and he doesn't need to keep a lot of capital tied up in inventory or in filling large orders.

Missile Cancellations—The smaller producer continues to wait for the word from the Pentagon on cancellation of duplicating missile projects like the Jupiter-Thor, Atlas-Titan, and the two antimissile missiles known to be in the development stage. Such cancellations, while relatively small in total Defense dollar savings, can mean the loss of 100 per cent of a single small outfit's defense business. An organization of small California defense producers, the Strategic Industries Association, which includes many electronic firms, is sparking the Senate Small Business Committee to protect such companies by seeing that they get new Defense orders.

On another level, a Clevelander believes rapid growth in electronics by individual firms is about over. He guesses that a refocusing of our missile and space efforts will bring a "flurry of mergers." The marginal operator is on his way out, fast.

New Trend — Large electronic companies no longer fear an invasion of their fields by aircraft firms in face of the shift in Defense spending from aircraft to missiles. It is working the other way around as large electronic firms move into the missile business as prime contractors. Examples include: Raytheon Mfg. Co., Waltham, Mass.; Western Electric Co., New York; and Philco Corp., Philadelphia.

Military Sales Keep Electronics Bullish

(In billions)

	Replacement Parts	Consumer Goods	Industrial	Military	Total
1960*	$1.1	$1.6	$1.6	$6.0	$10.3
1959*	1.05	1.45	1.45	5.0	8.95
1958*	1.0	1.4	1.35	4.25	8.0
1957*	0.95	1.4	1.25	3.5	7.15
1956	0.85	1.4	0.95	2.7	5.9
1955	0.75	1.5	0.75	2.5	5.5
1954	0.65	1.4	0.65	2.4	5.1

*Estimated by STEEL.
1954-56: Electronic Industries Association.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Aircraft Springs Expand

Springmakers benefit from all-out missile production; jet aircraft continue to supply a broad market. Aircraft firms make small percentage of the springs they use

PRODUCERS of aircraft springs will suffer no loss in dollar volume because of the switch from manned aircraft to missiles. In fact, it'll boost their already high-flying industry.

Stretchouts in aircraft production haven't hurt springmakers—yet. They haven't been asked to hold up delivery of present contracted items. But there will be a slight lag in new orders.

Missile markets can make up the difference. Most firms also report that the number of springs per plane is increasing, chiefly because more spring-actuated instruments are being used.

Materials—About 80 per cent of the springs are made of steel music wire. Other widely used materials include beryllium-copper, high-alloy steel, Inconel-X, 302 stainless, tungsten alloys, and bronze. Nonferrous alloys are growing in importance. Some aluminum is used.

Captive Work Low — Aircraft firms buy over 80 per cent of the springs they use. Hughes Aircraft Co. buys all the springs used on the Falcon missile. Northrop Aircraft Inc. makes a few; Lockheed Aircraft Corp. buys springs for most of its planes.

North American Aviation Inc. makes 20 per cent of its needs. But the industry doesn't plan to start mass-producing springs; it prefers to use its facilities for experimental components.

Applications — Eighty-five per cent of the springs are operating, 15 per cent are retaining. Uses vary from operating simple latches to launching rockets and helping to provide artificial feel on controls for the pilot. They actuate hydraulic valves, landing gear, powerplant systems, surface controls, tow-target releases, electrical and electronic instruments, and air-to-air refueling devices. They are also found on seats, canopies, doors, brakes, latches, and armament.

On the Northrop F-89D, rocket flaps and dive brakes are spring actuated. So are Falcon missile pods on the F-89H.

Numbers Vary—Lockheed estimates that 200 to 250 springs are used on its T2V-1. Northrop's F-89H uses about 300. The North American F-100D uses over 1000 (cost: $2500). Hundreds of tiny springs are hidden from view in small motors, microswitches, and instruments.

Compression springs are most widely used. Lockheed uses 60 per cent compression, 35 per cent tension, 5 per cent torsion. Only compression types are used on the Falcon. The F-89D and F-89H use mostly extension springs.

Specials—At least 95 per cent of the springs Northrop purchases are designed to company specifications; at Lockheed, 70 per cent; at North American, about 80 per cent. It is increasingly difficult to buy the right spring off the shelf.

Applications on missiles include most of those common to manned aircraft. They're also used extensively in devices for energy storage of a one-shot nature and on gravity arming devices which keep the missile from exploding prematurely. The most critical job: Electrical contacts on connectors. They must be rugged, reliable, tiny, and made of a highly conductive material.

Among springmakers' problems: Improving heat treatment and quality control, and producing to close tolerances while insuring strength at elevated temperatures.

Official U. S. Air Force photo

The 1000 springs used in this North American F-100 D cost $2500

B-W's Calumet Expands

Calumet Steel Div., Borg-Warner Corp., will begin a two-stage multimillion dollar expansion and improvement program in Chicago Heights, Ill. Completion schedule: Late 1959 and mid-1961.

First Stage—This phase is expected to "increase capacity 40 per cent, improve product quality, broaden the product line, reduce costs, and make possible round-the-clock operation."

To be completed in late 1959 are a combination rail, axle, and billet heating furnace, a roll conditioning and machine shop, fence post finishing shop, expanded merchant bar finishing and reinforcing bar fabrication shops, and stands and tables for the 14-in. rolling mill. Tube mill improvements and relocation and rearrangement of the material yard also are scheduled.

Second Stage—This phase includes installation of electric furnaces and additional rolling and finishing facilities by mid-1961. Purpose: Broaden the division's market base and add new billet steel products to the line.

The division recently bought a 35-acre site adjacent to its property. It has completed a new office building and is constructing an electrical substation.

AC Spark Plug's Martin Caserio discusses the . . .

Big Job for Missile Vender

INERTIAL GUIDANCE, the technique of steering missiles with a completely built-in system, is the basis of a rapidly developing industry. The role venders can play in this part of the missile program is discussed here by Martin J. Caserio, manager of the Milwaukee Works, AC Spark Plug Div., General Motors Corp. (For more details on AC Spark Plug's program, see Pages 64-65.)

Q. Do you need venders to supply parts for inertial guidance systems?

A. We make extensive use of venders in our guidance program, but we are working with extreme tolerances, so we have to expend more effort to find suppliers suitable for our purpose. We are working at the frontier of zero dimensions in making gyros. This could pose some real problems if we had venders who weren't well acquainted with what we must have.

Q. Are you set up to handle the administration of a group of venders?

A. Our purchasing people closely study the capabilities of each potential supplier. Once a contract is placed, our production control men work with the vender to help solve problems within his plant which could interfere with delivery. Our master mechanic department also assists in getting and setting up tooling.

Q. What parts do you think venders could make?

A. Quite a variety of parts are being made outside our plant—both mechanical and electronic. Such items as synchromotors, timing devices, microswitches, potentiometers, gages, transformers, and relays made five years ago are no longer adequate.

We must be able to make better and more accurate devices, but the problem is to do it economically. The cost of our new weapon systems comes high because of the quality and accuracy. Another aspect that goes with economy in this type program is maintenance of strict delivery. Developments are coming rapidly, and venders must keep up. We should adopt the attitude of being constructively discontented.

Q. What are your requirements on quality and inspection?

A. It is hard to imagine, but if an AC production gyro shifts 1 millionth of an inch we refuse it.

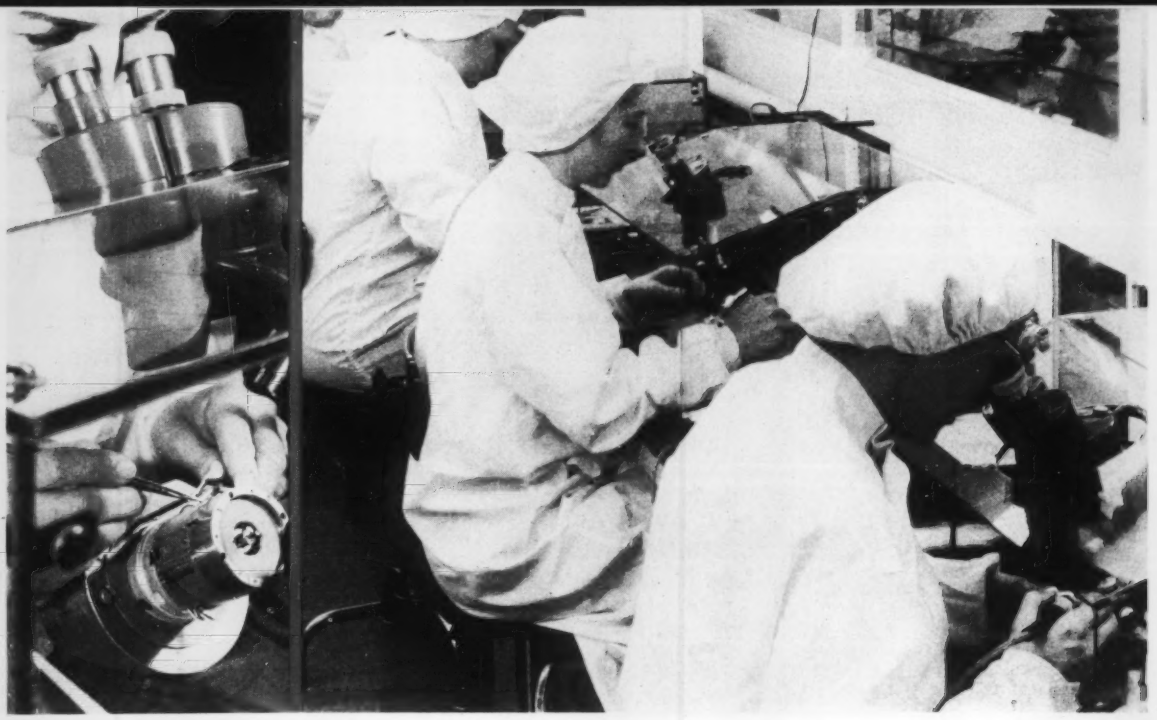
Q. What type security clearance, if any, will venders have to have?

A. In most cases none. Normally, the vender need know only what we require in a particular part which would be unclassified insofar as military security is concerned. He needn't see the entire system unless it happens to be what we term a critical part. If it is, we will help him obtain clearance through the Air Force.

Q. Can you tell us how permanent the work is likely to be?

A. The future for inertial guidance looks good. It is the best possible method to guide missiles since it is a completely self-contained system, emits no signal, receives no signal—hence cannot be jammed or deterred from course by manmade interference. Accuracy, by past standards, is phenomenal.

But beyond its capabilities as a missile guiding system, it offers enormous potential in the commercial field. It can take a plane from New York to Paris, for example, without the pilot once touching the controls.



In the "clean room," workers assemble gyros for missile guidance systems. Each of the operators views his work through a 30-power microscope. The room, tables, walls, and light fixtures are vacuumed twice each shift. Walls have been scraped with razor blades to get rid of all paint flecks that might get into gyro assemblies. Close-up at left shows operator assembling the gyro under a plastic hood that helps keep any stray lint or dust out

How To Make Missile Parts

Extreme precision becomes commonplace. Here's how AC Spark Plug Div., already in production on inertial guidance systems, goes about meeting the tolerances

A PRODUCTION man points up two problems in the pernickety business of making missile guidance systems: "The human body is too warm, and dust is too big."

When you're working with tolerances of millionths of an inch, the warmth of an inspector's hand can make a good part look bad on the gage. A fleck of dust can be larger than some of the tolerances and can keep a gyro, for example, from working.

Two in One—At GM's AC Spark Plug Div.'s new electronics plant near Milwaukee, workers are turning out inertial guidance systems for the Thor, Matador, and Regulus missiles. To get the tolerances they need, AC men have set up what amounts to two machine shops within the plant.

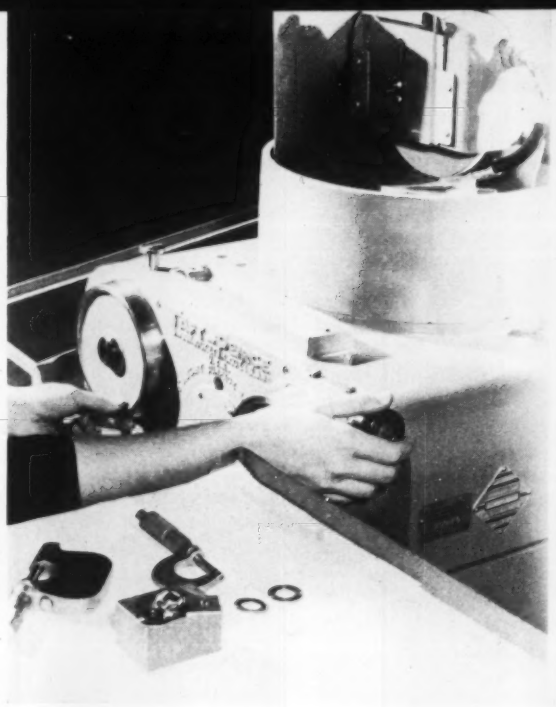
One shop uses conventional machines and tooling. Its products are machined to normal tolerances, say $\pm$ 0.002 in. Many of parts become the blanks for the precision machining departments.

Precision machining is done in an isolated island within the plant. The whole area is walled off, air is cleaned and circulated. In these departments, 0.0002 in. is a big tolerance, and you hear many workers talking about (and see them working with) millionths of an inch.

Assembly — The "clean room," where gyros are assembled, deals in extremes. The whole area is air conditioned. Humidity and temperature are closely controlled. Workers checking in have clothing and shoes vacuum cleaned. They wear lint-free nylon coats, hats, and booties to cover their street shoes.

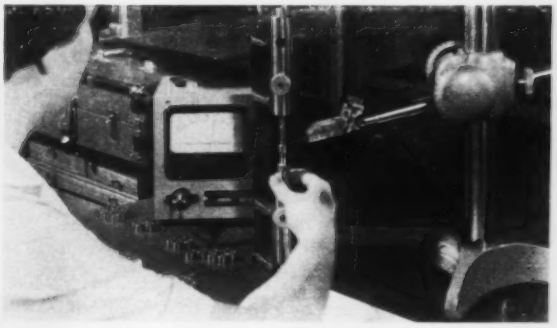
The clean rooms are cleaned every day, and they're vacuumed twice each shift. All parts coming into the rooms pass through a locker with a door at each end. Since only one door is opened at a time, no outside air can get in.

Worth It?—Obviously, all this precision is costly. But it's a must, says Howard Fish, assistant master mechanic. The precision must be achieved the first time on all parts in a lot, and anything that can be done to get it is worthwhile. It would be impossible, he feels, and even more costly, to use more conventional techniques with the hope that some parts would be good and the others could be repaired.

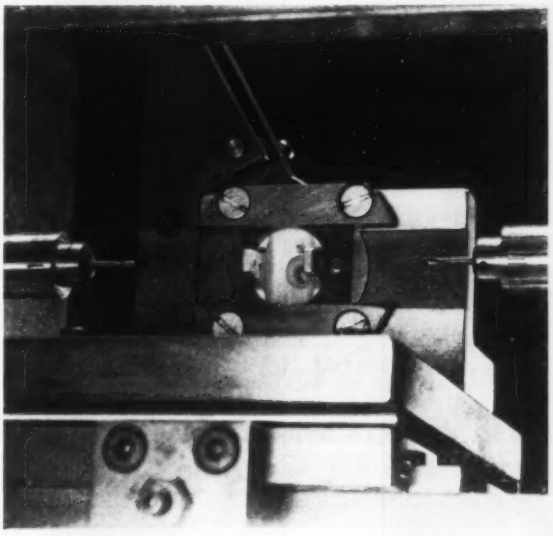


Stainless steel spacers, hardened to 65 Rockwell C, are ground on this Taft-Peirce rotary surface grinder. The parts (about 1 in. in diameter) are being ground to a thickness of 0.161 in. Here are the tolerances for this operation: Thickness within twenty-five millionths of an inch; squareness of sides to edges within thirty-millionths; surfaces parallel within twenty-millionths. It takes the operator about 15 minutes to grind both sides of one spacer

At one of 30 such stations this woman is deburring gyro parts. Using a 30-power microscope, she scrutinizes all surfaces, looking for burrs, ridges, sharp corners, and any flecks of metal that might interfere with performance. To remove them, she'll use some 200 different tools, including about 17 dental picks, an assortment of rubber erasers, steel wool, cotton, and common sewing needles that have been specially ground to tool shapes. The 4-in. aluminum gyro part she's working on will take her about 2 hours to complete

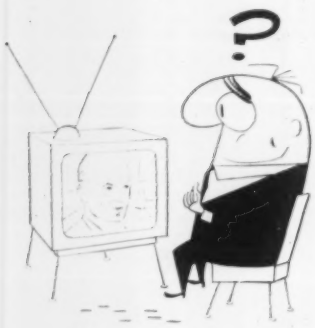


This operator is using a Cleveland Instrument Co. Indi-Ac to check the squareness of bore to face on gyro spacers. The tolerance: Twenty-millionths of an inch. The gage is calibrated to read to ten-millionths, and she can estimate to five-millionths



On this special machine, two holes are drilled in aluminum gyro gimbal forks. One hole is drilled 0.093 in., the other 0.100. Both must be concentric within 0.0001, within 0.0002 of size, and square to the faces within 0.0003. The machine is set for an automatic cycle that takes about 10 seconds

Finished gyros are mounted in the fixture at left. They're subjected to "tumbling" in which they are forced to react to conditions they'll encounter in missile flight. Every gyro has to pass this test before it can qualify for the inertial guidance system



How Do You Interpret Ike's Speeches?

"WE LEARN in the headlines that Ike sees rising defense costs. His speech in Oklahoma City can be translated as meaning sharp increases in the fiscal 1959 Defense Department budget. However, Ike also said we should save every dime we can. I interpret that as meaning we must look at what we are doing which is unnecessary and use that money to make new efforts," Defense Comptroller Wilfred McNeil told the National Security Industries Association at its recent meeting.

The possibility of violent disagreement between the Pentagon and the White House on defense spending is negligible: Defense Secretary Neil McElroy takes about the same line as Mr. McNeil (see Page 59).

Conclusion: Ike's speech was designed to allay public fears, but it should not be interpreted as an indication of vast new spending to come. The Pentagon is unanimous in estimating our defense budget for fiscal 1959 at between $39 billion and $40 billion, at the most a 5 per cent increase. That's barely enough to cover inflated costs.

McNeil Tells Whole Story

Revising fiscal 1958's spending by $400 million to $38.4 billion, Comptroller McNeil stated flatly that all bills owed by the Pentagon in this fiscal year will be paid on time. The $400 million increase represents the decision to reverse former Defense Secretary Charles Wilson's plan to slow up payments to stay within the old $38-billion ceiling.

Mr. McNeil admitted some companies will have to carry more expenses than they have in the past, but he indicated progress payments of 70 per cent will hold. Companies on cost-plus contracts will carry more work in progress and inventory costs than they have. Interest on borrowed money will not be allowed. But the Pentagon will consider compensation for additional capital required.

"Our basic policy will not change," said Mr. McNeil. "We will continue a stable effort, ranging within what we can pay for. We have not lost sight of our fiscal problems."

Congress Checks Hot Metal Contracts

To learn if contracts between a primary producer and consumers for delivery of molten aluminum are hurting small aluminum fabricators, Rep. Sidney Yates' (D., Ill.), Minerals & Raw Materials Subcommittee last week called witnesses from the Big Three of aluminum and autos.

The subcommittee learned Reynolds Metals Co.'s contracts for hot metal with General Motors Corp. at Massena, N. Y., and Ford Motor Co. at Listerhill, Ala., call for delivery at a saving of about 2 cents per pound below the market price. Chrysler Corp.'s chief engineer, M. F. Garwood, reported his firm does not plan to negotiate such contracts.

Earl Ward, Ford's vice president-purchasing, admitted there might be a "temporary" dislocation of relations with its 70 casting suppliers as a result of the Listerhill operation. Now in operation, Ford's plant will take 15 million to 18 million lb of hot metal from Reynolds in 1958, said Mr. Ward. The contract calls for maximum delivery of 64 million lb a year for ten years. Mr. Ward estimated Ford's consumption of aluminum at 127 million lb in 1959; the aluminum content of the average Ford will be about 53 lb.

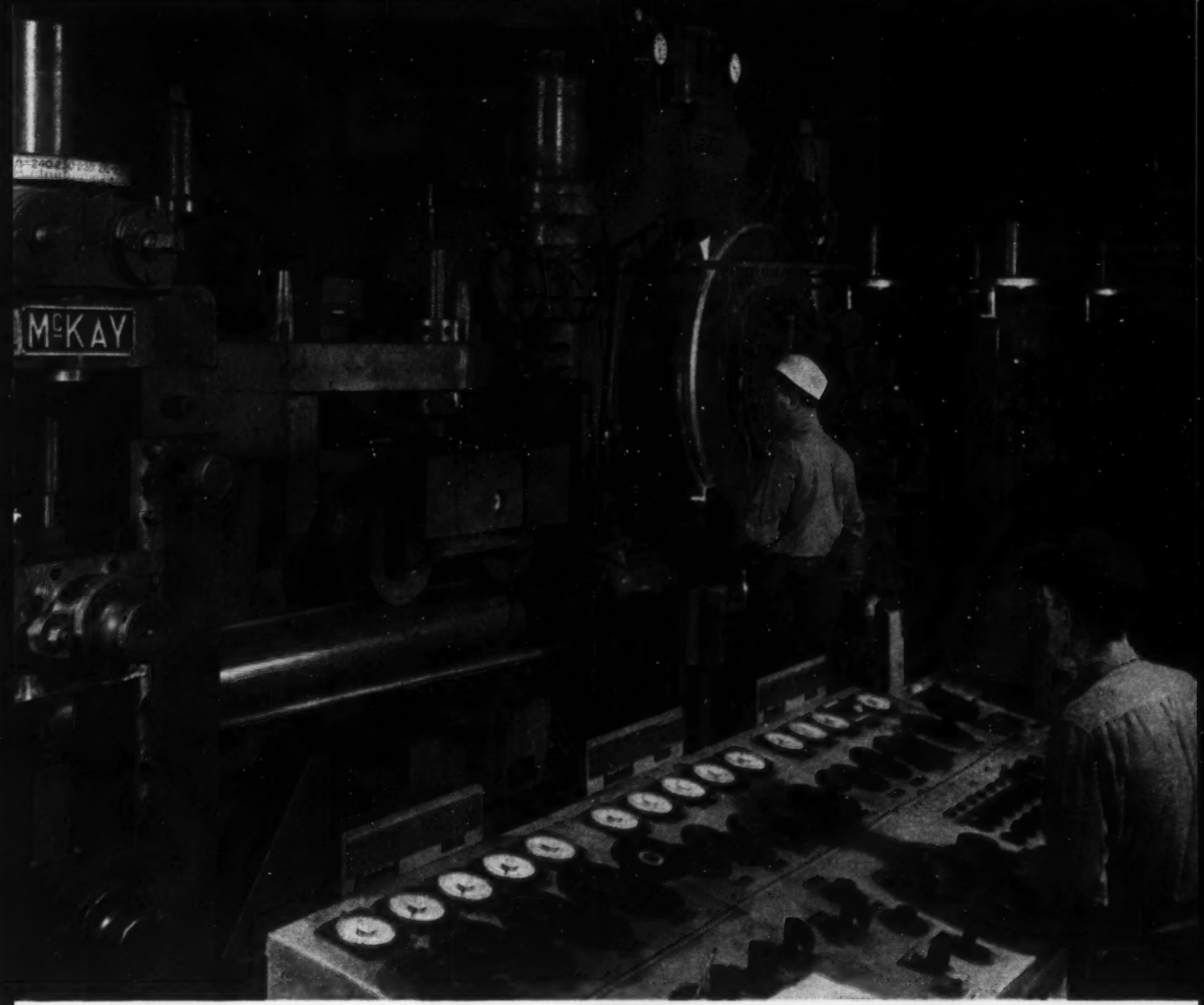
Demand Will Make Up Fabricators' Loss

All the auto and aluminum executives agreed that increased use of aluminum by the auto industry would make up for any business lost to hot metal. GM's John Cronin, vice president in charge of manufacturing staff, expressed surprise at Chrysler Corp.'s average use per car (100 lb), compared with GM's 48 lb. His engineers would look into the matter, he commented. He reported half the fabricated aluminum used by the corporation in 1958 would come from outside suppliers. The Massena contract for 75 million lb a year will not cause GM's 171 fabricators any trouble, Mr. Cronin hoped.

He predicted GM's use of aluminum would go to 75 lb per car by 1965. Massena aluminum will go first into the transmissions and pistons of 1960 Chevrolets. GM's contract calls for Reynolds to supply at least 50 per cent of the metal for its Chevy transmissions and 25 per cent of the metal for its pistons. There is no maximum on what Reynolds can supply.

BDSA Changes Some Divisions

The Business & Defense Services Administration has made some organizational changes which affect metalworking: An Office of Industrial Mobilization has been set up; the automotive, shipbuilding, railroad, ordnance, and aircraft divisions have been combined; the General Industrial Equipment and the General Components Divisions are now one division; the Office of Construction Statistics has been separated from the Building Materials & Construction Division.



Advanced Design McKay Mill Sets Pipe Production Records At J&L

New era in pipe production comes of age as McKay incorporates oil cooled transformer, continuous visual recording of weld pressure and induction seam annealing, automatic control of weld speed and heat and synchronization of cut-off in large resistance weld pipe mill.

RECENTLY Jones & Laughlin Steel Corporation set into operation their new McKay Pipe Mill capable of producing 150 feet of 12¾" OD electricweld pipe every minute. More important than the speed, according to J & L officials, is the quality of the product. McKay's forced oil cooled transformer assures more pipe per kilowatt hour. It is the first 2400V transformer designed for continuous operation at frequencies up to 180 cycles.

Hydraulic load cells measure forging and electrode pressures at the weld zone. Weld speed and heat are controlled with precision to assure the most uniform welds possible at any speed with no readjustment necessary. Continuous seam annealing assures uniform ductility of pipe, and for the first time a synchronized cut-off has been successfully adapted to a large mill. The mill has several other advanced innovations applied to a line this size for the first time. To get all the facts talk with a McKay engineer soon.

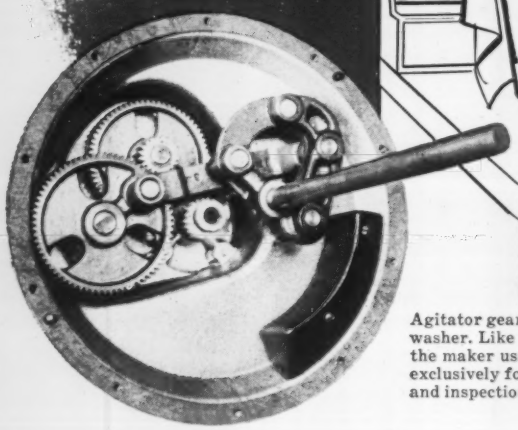
McK

THE McKAY MACHINE COMPANY
YOUNGSTOWN, OHIO

No. 363

GEARED

to make "Monday morning" a breeze!



Agitator gears for a famous automatic washer. Like many other companies, the maker uses Fellows equipment exclusively for gear cutting, shaving and inspection.

Consider that modern marvel, the washing machine! It may handle *unbalanced* loads of 75-pounds of clothes and water... but it keeps working efficiently and quietly day after day, year after year. Yet it costs so little nearly everyone can own one.

The use of gears cut on Fellows Gear Shapers is one of the important factors contributing to the long-time, trouble-free service today's washers give. These gears must be of high quality and production cost must be low. Many makers of washers and other major appliances meet these requirements for accuracy and economy by cutting their gears—and other shapes—on modern Fellows Production Equipment.

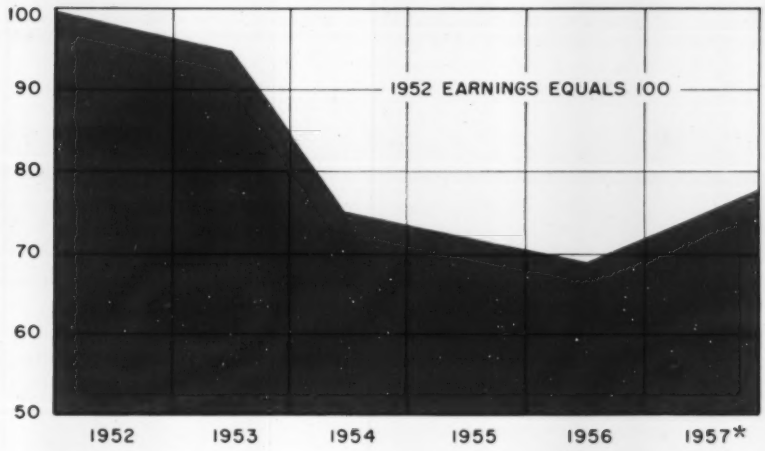
Your own gear cutting needs, from 1/16" to 120" P.D., can probably be met more profitably and efficiently with Fellows Gear Production and Inspection equipment. Why not get full information? Write, wire, or phone any Fellows office.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices:
1048 North Woodward Ave., Royal Oak, Mich.
150 West Pleasant Ave., Maywood, N. J.
5835 West North Avenue, Chicago 39
6214 West Manchester Ave., Los Angeles 45

THE PRECISION LINE

Fellows *Gear Production Equipment*

Earnings of Electrical Equipment Industry



*First half. Source: Mark W. Cresap Jr., executive vice president, Westinghouse Electric Corp.

Plea for 'Fair' Prices

Continued growth of electrical equipment industry is threatened by the lack of satisfactory profits, Westinghouse official warns producers' association

PRODUCERS of electrical equipment must "face the economic facts of life," Mark W. Cresap Jr. of Westinghouse Electric Corp. warned the National Electric Manufacturers Association at their annual meeting. He believes "fair prices" are a must.

"Unless we can meet the financial requirement of generating the wherewithal to back up the demands placed on us, we cannot deliver the goods," said Westinghouse's executive vice president.

He added: "A clear warning is signaled by a 25 per cent decline in return on stockholders' equity in the industry over the last five years."

Too Slim—Pointing out that an industry cannot continue without a "satisfactory profit," Mr. Cresap said profits must support the underlying research and development for better products. They must also accumulate and attract capital necessary to create facilities to produce those products.

"Our profit margins have been declining in recent years at a rate that warrants our most serious attention," he continued.

Using an index with 1952 earnings equaling 100, Mr. Cresap showed a steady drop in electrical equipment earnings from 1953 through 1956—there was a mild upturn in the first half of 1957 (see chart above).

Lagging—All industry has been "caught in the vise of severe cost-price squeeze" he said. Other industries, he stated, have had more "price relief" than producers of electrical equipment.

During the five-year period, Mr. Cresap said, the steel industry has increased prices 9 percentage points more than the electrical equipment industry.

In the 22 industry classifications of U. S. business used by the Department of Commerce, the electrical equipment industry dropped from third in rate of return in 1951 to eighth in 1956, he pointed out. In 1956, he stated, his industry ranked fourth from the bottom out of 11 classifications in the durable goods field.

He said that a continuation of this development "poses two inescapable threats to our industry": 1. Effect on ability to support research and development. 2. Effect on ability to get funds necessary to satisfy indefinitely the requirements for new plant and equipment.

"The tremendous significance of lower profits from which to finance research and development is pointed up sharply by the fact that in the electrical equipment industry these programs cost three times as much, in relationship to sales volume, than in the industry as a whole," Mr. Cresap asserted.

During the last five years, he said, the industry's retained earnings, plus depreciation, have failed to equal capital expenditures "by a considerable amount."

Strength Needed—"The problem of the future may be intensified if the rates of profit continue in the direction recently established, particularly as the demands for capital investments continue to increase, which is the inevitable consequence of the expanding base of the business," he warned.

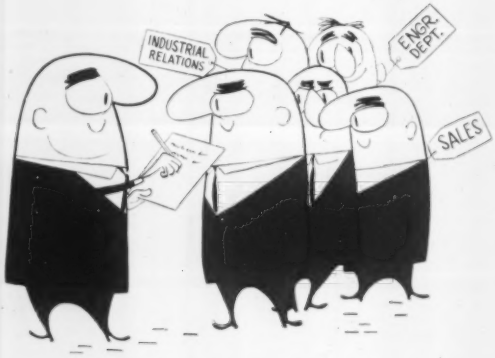
Long-term health of the industry cannot be assured unless fair prices are received for its products —"prices which permit reasonable profits," he emphasized. A strong and growing electrical equipment industry, he pointed out, is important to national defense, to the electric utility industry, to manufacturers generally, to users of electrical products, and to the industry's own employees.

GE Will Move Plant

General Electric Co. will move its industry control plant from Oakland to San Leandro, Calif., next year. A 30,000 sq-ft plant will be built on a 2.2-acre site. Reason for the move is to give GE's wire and cable plant in Oakland more space.

AC Adds Office to Plans

As part of a current $10-million expansion program, AC Spark Plug Div., General Motors Corp., will construct a 140,000 sq-ft office building in Milwaukee.



Personnel Inventory Enables Weirton...

1. To utilize the talents and potential of everyone to the maximum.
2. To improve job performance at all levels.
3. To insure the supply of understudies, reserves, and replacements in the management organization.
4. To improve co-ordination and teamwork within and between departments.
5. To develop effective problem solving at all levels of management.
6. To build a strong, competitive, cost-conscious management organization.

This Firm Builds People

A STOCKPILE of skills is among Weirton Steel Co.'s most valued resources. E. O. Burgham, president of the Weirton, W. Va., division of National Steel Corp., says the company's pool of talent proves its value every time vacancies must be filled.

Weirton revamped its management program in 1955 to include a plan for management development. Several things prompted the move: 1. The average age of supervisors had increased. 2. The number of employees increased 25 per cent between 1944 and 1954, resulting in the need for more foremen. 3. The company wanted to use its own people to fill jobs arising from extensive expansion of the Weirton plant.

The Problem—"We had to make certain that all potentially qualified people were considered for each promotion," adds Mr. Burgham. "Once we had a listing of skills, then interviewing, testing, and checking of work records would select the best man from the group of candidates for each promotion. What we needed was a file that could quickly show the talents of all our employees."

Weirton relied upon its personnel inventory. The basic step was a questionnaire which was sent to each employee. Workers listed personal data, business experience, military service information, education, special interests, and ambitions.

Results—Edward A. Ross, assistant vice president, industrial relations, says: "Results surpassed our most optimistic predictions. Of 13,500 employees canvassed in Weirton and Steubenville, Ohio, plants, 11,000 returned their questionnaires. We consider the return rate remarkable since the reports were filled in on a voluntary basis."

Weirton used a code system to tabulate information on each employee, to keep it confidential. Coding, evaluating, and cross-indexing required about six months.

Using the File—Results soon repaid the investment in time and trouble. In nearly 100 cases, Weirton selected company personnel to fill technical and supervisory jobs by referring to its inventory file.

Example: Weirton's industrial engineering department needed 19 men to conduct a random sampling survey of work performance. Earlier, it would have been difficult to obtain a group with the proper skills. Using the files, the industrial relations department furnished names of 50 employees qualified to do the work. Without exception, the 19 selected proved capable.

Helping a Customer—A West Virginia fabricator and user of Weirton's steel wanted to train one of its men for a high management post, but it didn't have a qualified instructor. Weirton was called for assistance. It found a man with the required knowhow in its personnel files and released him to work for the customer. Benefits were threefold: Weirton improved its relations with the customer; the customer got the executive it needed; and the executive's morale was boosted by his rapid advancement.

More Benefits—Aside from building a strong reserve of future executives, Weirton reaps additional advantages from its personnel inventory. Labor relations personnel point out that advances in skills may not be shown on other company records. A continuing personnel inventory will keep the company abreast of its employees' growth.

Trend to Sintering Grows

Makers of ore processing equipment see long term sales growth. As high grade deposits wane, mills will use more ore in sintered or pelletized form

"ALMOST ALL the major steel producers have new sintering plants or are building them," says a mill equipment manufacturer.

Despite the boom, he sees no letup in long term demand for sintering machinery and other ore processing equipment. "We haven't begun to tap the potential," he asserts.

Here's Why — Peter Robertson, vice president, research and planning, Republic Steel Corp., Cleveland, says: "We are continually depleting our rich ores. At the same time, we are making great advances in beneficiation of low grade ores. American firms have acquired many new high grade deposits in other countries. Most of them contain a high percentage of fines which require sintering before being used in the blast furnace. It seems inevitable that greater amounts of ore will be sintered in the future."

American sintering capacity was about 30 million tons in 1955. Its importance grows with our dependence on ore imports. They'll double between 1956 and 1960, when the industry estimates that 41 million tons will be brought into the country. Half will come from Canada, half from other countries. By 1960, sintering capacity will be at least 60 million tons.

Nine Firms Expand—This year, nine steel producers completed or began construction of sintering plants. Their 19 machines at 14 plant sites have a combined capacity of 26.4 million tons annually. U. S. Steel Corp., Pittsburgh, has seven new machines with an annual capacity of 13.9 million tons. National Steel Corp., Pittsburgh, installed two machines with capacity of 4.5 million tons.

While sintering is making rapid strides, there's no indication that it has reached a peak. Few steel producers have space for additional blast furnaces, and fewer still can afford to build them (a furnace and supporting coke ovens cost about $40 million). A more economical method of increasing capacity is to boost the output of present facilities. While a large sintering plant costs from $5 million to $10 million, it saves money in the long run by improving blast furnace efficiency.

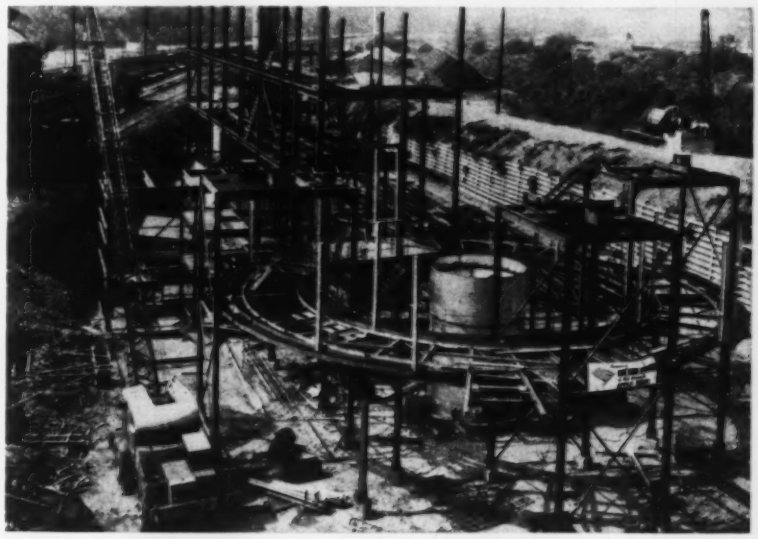
Better Results — Under normal conditions, the Weirton Steel Div. of National Steel, Weirton, W. Va., operates a blast furnace without beneficiated burden at its rated capacity of 1200 tons of iron daily. During August, with the use of oxygen, better coke, improved burden, and higher blast heats, the furnace averaged 1700 tons a day.

Improvements at four Weirton furnaces increased iron production from 4500 tons a day in 1952 to 5750 tons in 1957, a gain equivalent to adding another furnace.

Equipment Improves—Advances in sintering techniques make the machines a better investment than ever before. McDowell Co. Inc., Cleveland engineering firm, says improvement of bed permeability aids productivity. Engineers at Dravo Corp., Pittsburgh, add: "Automatic weighing of material and improvements in feeding ore make new sintering equipment far better than its predecessors." Steelmakers have found television helpful in maintaining a close check on sintering operations.

Pelletizing Gains — Manufacturers of pelletizing equipment are also optimistic. They think annual consumption of taconite will be 17.8 million tons by 1960. Jasper is also slated for greater use. Both ores require processing at mine sites before shipment. A user of jasper pellets says they maintain their composition while being stored and increase blast furnace efficiency.

Although producers of sintering and pelletizing equipment have good prospects for long term sales increases, their immediate outlook is clouded by steelmakers' cautious spending. Says one Pittsburgh steel producer: "With our operations falling below predicted levels, we have more iron ore than we need. We won't buy new processing equipment now, but if we want to keep our production up and costs down in future years, we can't afford not to invest in it."

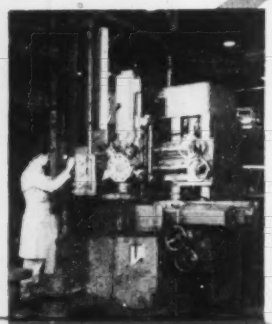


Armco Steel Corp.'s new sintering plant at Ashland, Ky., begins to take shape. Scheduled for completion next spring, the $5-million-plus installation will produce at least 2400 tons of sinter a day. Construction work is being done by Dravo Corp., Pittsburgh

no need for Obsolescence with **BULLARD**

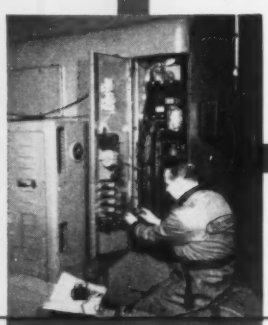
VERTICAL TURRET LATHES

Model 75



36" Bullard Cut Master V.T.L., Model 75 manually controlled from Pendant Control.

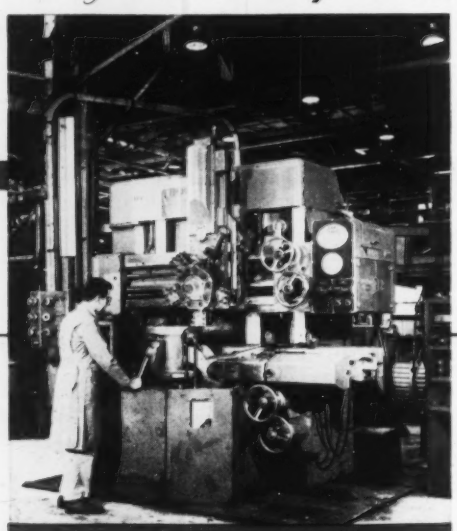
Bullard Service Engineer guides Man-Au-Trol Conversion Unit into place.



Electrical connections for Man-Au-Trol are wired into Cut Master Control Panel.

In May, 1955, Hyster Company, Peoria, Illinois, installed a 36" Cut Master V.T.L., Model 75 and by the end of 1956 it was evident that due to increased requirements an automatically controlled machine was necessary. *Did this obsolete the Cut Master?* — No sir — it only meant adding a Man-Au-Trol Conversion Unit to Cut Master *right in their plant. And it was accomplished in only four days.* No need to obsolete Bullard Cut Master, Model 75 — just convert them.

another way to cut costs when cutting metal — **buy BULLARD**



Man-Au-Trol installed for automatic control of Turret Head.

For the complete information on Bullard Vertical Lathes call our nearest Sales Office or Distributor.

THE
BULLARD
COMPANY
BRIDGEPORT 9, CONNECTICUT

U.S. Car Production

(Millions of units)

	1957	1956
4th Quarter	1.6*	1.5
3rd Quarter	1.0	1.1
2nd Quarter	1.5	1.5
1st Quarter	1.8	1.7
Total	5.9	5.8

*Projected.
Adapted from *Ward's Automotive Reports.*

Detroit's Last Quarter Good

Clean closeout of 1957 cars, plus heavy buildup for pipelines, bring new hopes to motordom. But strikes may keep projections from coming true

FIRST REPORTS on new car sales are only starting to trickle in, but producers are already beginning to boost last quarter production schedules to fill up pipelines depleted by a strong sellout of 1957 models.

The industry entered this month with less than 240,000 of its '57s in dealer showrooms. That's 110,000 less than the year-ago figure. Only 278,000 new models were in the field or en route to dealers when November's selling opened.

Outlook—To get enough cars into dealers' hands, the industry has programmed more than 622,000 completions for November. It'll turn out at least that many for the following month if it isn't crippled by strikes.

At last report, however, it looks like car builders will fall at least 90,000 units behind November's goal because of work stoppages at GM's Detroit Transmission Div. (serving Buick, Oldsmobile, and Cadillac). Chrysler's engine plant strike which started a week ago may seriously cut down its output.

Race—Ford and Chevrolet are doing their best to bring production up to peak levels in the last three months of the year. To the winner of this race goes a host of advertising spoils, and Chevrolet is trailing for the first time in years.

The GM division built 40,000 units in one week this month in an effort to wrest production laurels away from Ford, but that division pushed out 42,500 cars the same week to stay ahead by a narrow margin (some 1.33 million to 1.27 million units for the year to date).

Mill Orders Up—Detroit area steel mills report fourth quarter pickups in cold-rolled sheets and strip, as well as in hot-rolled products.

One producer says its sheet and strip orders through January are some 30 per cent higher than they were in '57's third quarter. Automotive purchasing agents say they expect to place even heavier orders for sheets and strip for the first quarter of '58.

The rash of rush orders which mills have been getting from the car industry is slowing down slightly, indicating that car producers are beginning to increase steel inventories a little beyond the 15 to 18 days they have been carrying.

Car Sales Trends—Comparison shoppers won't appear as sales statistics for another month, but some first run impressions can be gained.

So far, higher prices (averaging 3.3 per cent) haven't seemed to be a sales deterrent, but 1958 price shoppers won't enter the market for several months.

Question—The industry has cast a quizzical eye on Chrysler Corp. since it made few changes in its new cars. But Clare E. Briggs, sales vice president of the Chrysler Div., reports 1000 Imperials were delivered to customers in the first ten days of November, compared with 241 in the like 1956 period.

Dealer orders for the Chrysler Windsor are double last year's pace. Mr. Briggs thinks this line will be one of Chrysler's hottest.

Edsel Set?—Ford Motor Co.'s Edsel is behind predicted sales estimates this month, although it started strong with 11,655 sales in September.

Richard Krafve, Edsel general manager, thinks the car should get its real sales test this month and next. He says it faced too many price-cut '57s in October.

Less Magnetic Alloy

Ford Motor Co. scientists have added aluminum to iron to get an alloy with magnetic properties that decrease at low temperatures.

"Since the addition of aluminum to iron creates an alloy that also is noncorrosive, our discovery may be an important clue pointing to a close relationship between rusting and magnetism," explains Dr.

(Material in this department is protected by copyright, and its use in any form without permission is prohibited.)

GM Introduces the 1958 Pontiac Chieftain

The 122-in. wheelbase Chieftain series includes 2 and 4-door Catalinas, a 2-door sedan, and 2 and 4-door Safaris, plus the 4-door sedan pictured

Michael Ference Jr., director of Ford's scientific laboratory.

Research on the alloy has been done mainly by Drs. Anthony Arrott and Hiroshi Sato of the scientific laboratory. Its behavior is called antiferromagnetism. Until now, it was found only in certain chemicals.

In conducting experiments, the scientists used liquid helium to lower temperatures to within 3 degrees of absolute zero (minus 459.6° F).

S-P, AMC Report

Studebaker-Packard Corp., South Bend, Ind., says its losses in the first nine months were cut to $12.3 million on sales of $147.4 million. Total assets were $91.7 million, liabilities $42.7 million.

The firm raised prices $19 on its Scotsman two-door sedan and about $90 on the Golden Hawk. The Scotsman's advertised delivered price is now $1795. The Hawk's is $3282. These prices exclude state and local taxes, transportation, and accessories.

American Motors Corp. shows a net profit of more than $1 million in October. "The company's first fiscal quarter ending Jan. 1 will show substantial profits," President George Romney adds.

AMC should get into and stay in the black in fiscal '58, thinks Mr. Romney. He already has stated AMC will show an operating loss in fiscal '57 of less than one-third of the $31 million reported in fiscal '56.

It has boosted prices $76 to $114 above the 1957 tags.

Suggested factory list on the highest-priced Rambler six is $1875. On the deluxe Ambassador, it's $2822.

AMC will start making its 100-in. wheelbase Rambler American at Kenosha, Wis., on Dec. 2. Facilities for making all other Rambler bodies are being shifted to Milwaukee. Most of the 117 and 108 in. wheelbase bodies are already being built there.

Buys Syracuse Plant

Murray Corp. of America, Detroit, has purchased all of the manufacturing facilities used by its Easy Laundry Appliances Div. in Syracuse, N. Y. The division had been leasing these facilities from Union Chemical & Materials Corp. The transaction will enable Easy to launch a modernization program.

U. S. Auto Output

Passenger Only	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,619
May	531,365	471,675
June	500,271	430,373
July	495,629	448,876
August	524,354	402,575
September	274,265	190,716
October	327,362	389,061
10 Mo. Total	4,994,498	4,623,829
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
Oct. 19	72,180	88,557
Oct. 26	104,987	104,269
Nov. 2	126,139	117,583
Nov. 9	136,742	132,087
Nov. 16	144,627†	135,641
Nov. 23	148,000*	118,949

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Ready To Romp On Roads

Watch for highway construction equipment sales to begin a solid upturn by mid-1958. This year, $1.3 billion will be spent in land acquisition and engineering, $4.2 in construction contracts. American Road Builders Association officials predict a $700 million increase in '58, most of it in construction.

Two factors hamper the federal highway program: 1. Acquiring land for rights of way. 2. Shortage of engineers to do highway design work. ARBA and Construction Industry Manufacturers Association have made a movie aimed at gaining public acceptance of road locations.

Watch for some sort of government financial help for contractors in '58.

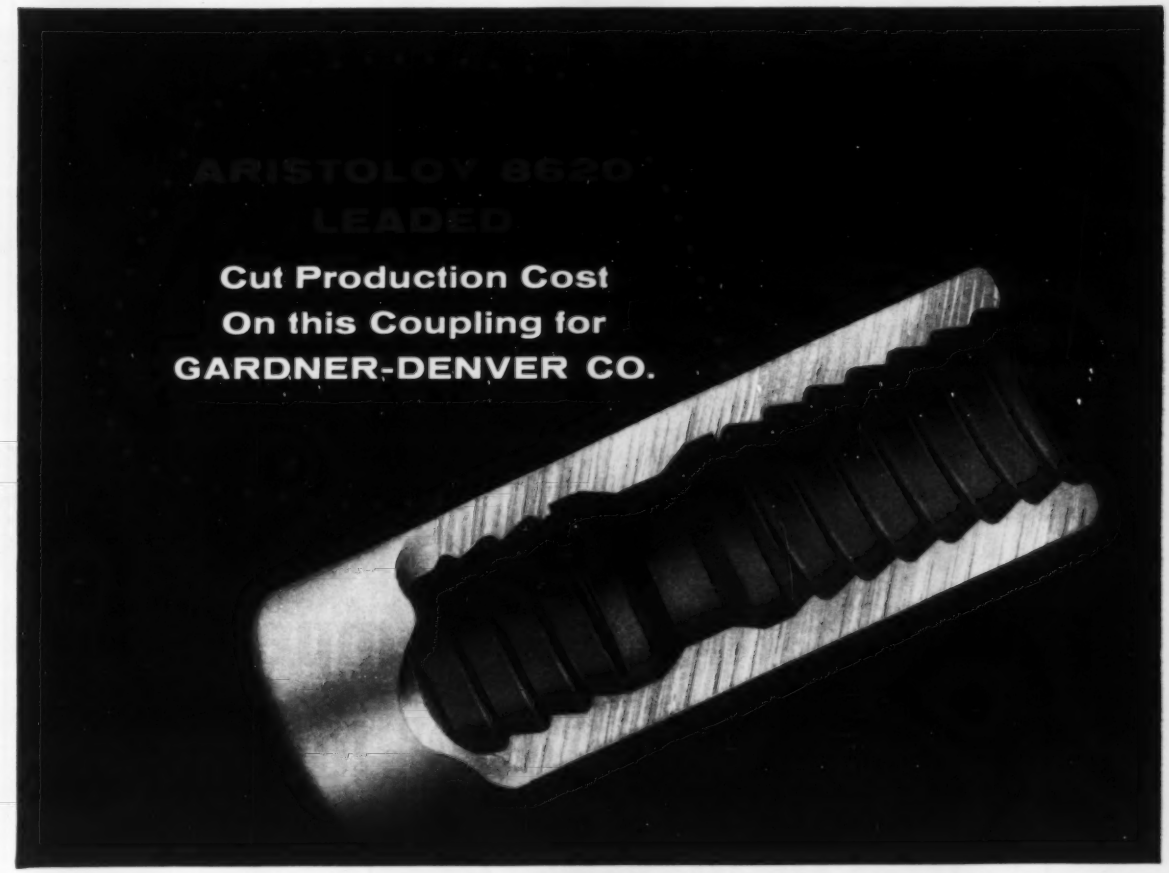
Exhaust Notes

• Alcoa can supply one-piece aluminum roofs for trucktrailers in widths up to 93 in. The firm's Davenport, Iowa, plant can make the sheets on its new cold-finish mill at a rate of 750 fpm.

• About 260,000 cars are available nationally for lease or rental. About 50,000 are being leased to individuals, says Byron J. Nichols, general manager of automotive group marketing, Chrysler Corp. He adds that some 250,000 trucks are being leased. That number may jump to 800,000 by 1965.

• Bostrom Mfg. Co., Milwaukee, has designed an aluminum Jeep seat frame with torsion suspension and canvas seating. It weighs 18 lb vs. 24 lb for the present seat. Willys Motors Inc., Toledo, Ohio, reports Jeep registrations increased 1.1 per cent in 1957's first half, while total commercial vehicles registrations dropped off 7.1 per cent.

• Efficiency of the American auto engine has increased about 50 per cent in the last 24 years, says John M. Campbell, scientific director of GM's research staff.



FASTER SPEEDS AND FEEDS ON 2 OPERATIONS
OVER 1/3 LONGER TOOL LIFE ON 3 OPERATIONS

AUTOMATICS

	A.I.S.I. 8620	Aristoloy 8620 Leaded
Spindle Speed R.P.M.	246	301
Feed I.P.R.	.0081	.0081
Machine Speed S.F.M.	120	150
Drill Speed S.F.M.	65	80
Minutes Per Piece	1.59	1.29

Tool Life Increased 35%

TURRET LATHES

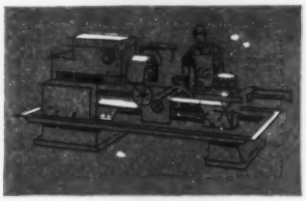
	A.I.S.I. 8620	Aristoloy 8620 Leaded
Spindle Speed R.P.M.	296	496
Feed I.P.R.	.021	.021
Machine Speed S.F.M. (drilling & boring)	85	118
Minutes Per Piece	2.31	1.91

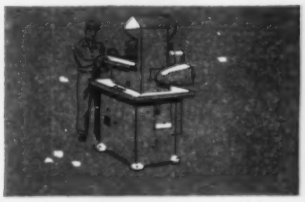
Tool Life Increased 35%

HOB MILLS (Threading)

Hob Speed S.F.M.	273*
Feed I.P.R.	11.8
Minutes Per Piece	1.84

*Maximum speed for machine. Changing to leaded Aristoloy brought about no improvement in machining time. However, tool life was increased 40%.





JUST OFF THE PRESS

For information on leaded steels, write for new 16-page booklet. Complete data on application of lead treated steels, plus data on mechanical properties and characteristics.

ARISTOLOY STEELS

COPPERWELD STEEL COMPANY • Steel Division

4005 Mahoning Avenue • WARREN, OHIO

EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N.Y.

Graph-air®

New, tougher tool steel air-hardens at temperatures as much as 400° lower... machines faster

THIS new tool steel—Graph-Air®—air-hardens at temperatures as much as 400° lower than other air-hardening tool steels. Temperature as low as 1450° F. is sufficient. This means simpler heat treat control, less distortion.

Because of its graphitic structure, Graph-Air machines faster. And there's less decarburization than with other air-hardening steels. Longer life, because the uniform, diamond-hard carbides in its structure help Graph-Air outwear other tool steels. And you get longer-lasting accuracy, because of Graph-Air's built-in stability. Graph-Air is fully as stable as other Timken Company graphitic tool steels, the most stable ever made.

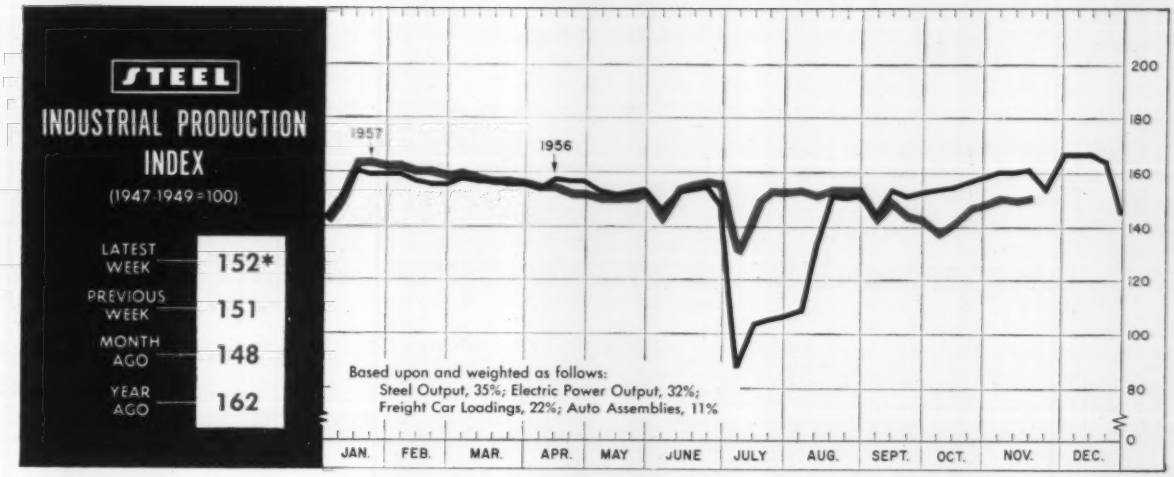
Graph-Air's uniformity of hardening plus minimum distortion make possible more intricate sections. You'll find it a better-than-ever answer for blanking dies and other steel parts that must withstand hard abuse.

For your jobs requiring a high quality, lowest-temperature air-hardening tool steel, specify Graph-Air. Available in solid and hollow bar sizes. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN *Fine Alloy* STEEL

TRADE-MARK REG. U. S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING



*Week ended Nov. 16.

Long-Term Gains Intact Despite Declines

HOW MUCH is $1 billion?

To the man on the street, it's a whale of a lot of money, especially if he has just lost his job—or had his overtime cut off, or had his workweek slashed to three days. To the economist looking at the big picture, last month's decline in personal income at an annual rate of $1 billion is less than one-third of 1 per cent of the total. It's impossible to slough off this decrease as completely unimportant, but when put in its proper perspective, $1 billion isn't so much these days.

Real Gains—Despite this latest setback, personal income is still at an annual rate of $345.6 billion, compared with $332.5 billion just a year ago or $206.8 billion in 1949. In October, over 66 million persons were working in this country, the most ever for that month.

The average workweek was 39.5 hours—not as good as some periods in recent years, but certainly not depression level. (In 1949, the average was 39.2 hours.) Average hourly gross wage for production workers in manufacturing last month was $2.08, compared with $2.02 the year before. (In 1949, it was $1.40.) In the high-paying metalworking industries, the hourly average was $2.32 in October (see chart, Page 78). In 1949, it was only $1.53.

With wages—especially overtime—at such high levels and with substantially full employment, it doesn't take much of a fluctuation in the over-all picture to produce a gain or loss of $1 billion a year.

The current picture is filled with many such losses which tend to overshadow the real gains of the long term. When examined in relation to these gains, our economy is not as bad off as many pessimists would have us believe.

Comparisons—So far this year, manufacturers' monthly shipments have averaged $28,611,000,000, or 74 per cent better than the monthly average of 1949. Using average monthly shipments of that year

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,965[1]	1,990	2,463
Electric Power Distributed (million kw-hr)	11,900[1]	11,914	11,589
Bituminous Coal Output (1000 tons)	9,405[1]	9,770	10,201
Petroleum Production (daily avg—1000 bbl)	6,775[1]	6,796	7,159
Construction Volume (*ENR*—millions)	$373.0	$147.9	$369.9
Auto, Truck Output, U. S., Canada (*Ward's*)	144,627[1]	136,742	135,641
TRADE			
Freight Car Loadings (1000 cars)	680[1]	675	763
Business Failures (Dun & Bradstreet)	266	250	219
Currency in Circulation (millions)[3]	$31,287	$31,114	$31,141
Dept. Store Sales (changes from year ago)[3]	−1%	−2%	−3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,019	$21,630	$19,473
Federal Gross Debt (billions)	$273.7	$273.7	$275.0
Bond Volume, NYSE (millions)	$25.9	$21.6	$24.1
Stocks Sales, NYSE (thousands of shares)	11,671	9,666	10,044
Loans and Investments (billions)[4]	$86.3	$86.7	$85.6
U. S. Govt. Obligations Held (billions)[4]	$25.0	$25.2	$25.8
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	225.92
STEEL's Nonferrous Metal Price Index[6]	206.4	206.3	257.0
All Commodities[7]	117.8	117.5	115.6
Commodities Other Than Farm & Foods[7]	125.6	125.6	123.9

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

DO YOU

EMPLOY 100 OR LESS?

Management of smaller firms, experiencing growth potential and seeking to relocate or expand are considering Gardner, Massachusetts.

This away-from-target area, the economic and labor advantages, plus the new Gardner Program to attract growth firms is an expansion opportunity to be included in your program planning file.

If you do not know the Gardner Story, write, wire or phone:

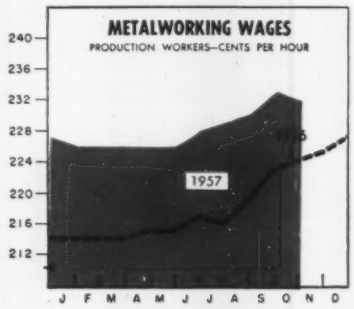
Eugene McSweeney, Director
Gardner Industrial Foundation
Gardner, Massachusetts
Telephone Gardner 3775

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

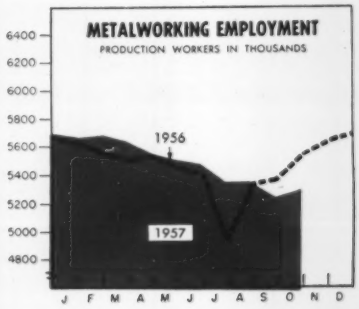
THE BUSINESS TREND



1956	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Oct.	242	213	225	202	237
Nov.	244	213	225	204	239
Dec.	245	215	226	205	243
1957					
Jan.	247	213	226	206	237
Feb.	245	213	227	206	238
Mar.	246	214	228	206	238
Apr.	246	214	228	206	238
May	246	215	228	205	237
June	248	217	230	207	240
July	252	218	230	205	241
Aug.	253	219	230	205	242
Sept.*	256	222	232	207	246
Oct.*	254	221	231	207	246

*Preliminary.
U. S. Bureau of Labor Statistics.

Charts copyright, 1957, STEEL.



1956	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Oct.	1,132	911	1,264	914	1,319
Nov.	1,132	911	1,273	918	1,402
Dec.	1,133	909	1,289	907	1,439
1957					
Jan.	1,130	906	1,299	892	1,440
Feb.	1,124	903	1,294	877	1,482
Mar.	1,112	898	1,291	869	1,474
Apr.	1,101	889	1,277	853	1,446
May	1,093	883	1,255	847	1,435
June	1,093	887	1,239	855	1,415
July	1,075	869	1,207	848	1,373
Aug.	1,077	878	1,180	861	1,363
Sept.*	1,070	876	1,185	881	1,262
Oct.*	1,055	882	1,160	879	1,337

*Preliminary.
U. S. Bureau of Labor Statistics.

as 100 per cent, some of the indexes for metalworking industries show up as follows on the basis of September reports: Aircraft, 797 per cent; auto parts, 195; building materials, 207; copper, 162; electrical equipment, 182; agricultural machinery, 104; industrial machinery, 253; machine tools, 311; metal fabricating, 183; steel, 190.

For the aircraft, auto parts, building materials, electrical equipment, and industrial machinery industries, these figures represent September records.

In every long-term trend, there are bound to be some temporary setbacks. That is probably what we are going through today, and many economists think it is a healthy thing. It is bound to trigger some outbursts of pessimism. But there are still many businessmen whose quiet, long-term optimism is based on the fact that we are still far better off today than we were a short while ago and on the expectation that growth lies ahead.

Sees No Big Depression

Tri - Continental Corp., Wall Street investment organization, feels that any thought at present of a severe depression is without basis. It lists the following as safeguards against it: Stability of government expenditures; a rise in state and municipal expenditures; the high level of personal income and savings; the readjustments that have already taken place; and the high—though declining—backlogs.

However, the corporation warns, business activity is more likely to decline moderately during the months ahead than to experience a resurgence of the boom. It is just as important to be prepared for an upturn as it is to see that the gentle decline does not get out of hand, the firm adds.

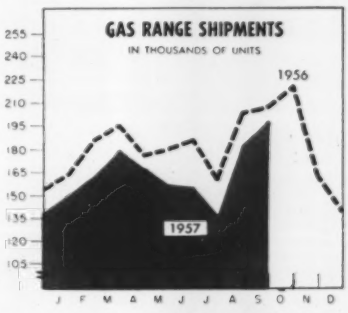
Index at Standstill

STEEL's industrial production index is stalemated by countertrends among its four elements. The preliminary reading of the index for the week ended Nov. 16 is 152 (1947-49=100). Auto production and output of electric energy are gaining strength, but steel production and freight carloadings are falling farther behind the year-ago pace.

If total output of cars and trucks next month comes up to last year's

	1957	1956	1955	1954
Jan.	126.34	122.43	97.00	93.56
Feb.	139.29	129.56	98.71	96.45
Mar.	140.76	166.14	149.16	115.55
Apr.	132.67	145.20	109.52	122.76
May	157.95	155.53	110.50	98.54
June	121.57	189.13	139.00	112.42
July	128.31	165.50	111.76	91.68
Aug.	110.09	168.70	106.20	94.06
Sept.	116.79	130.35	136.80	88.43
Oct.	.....	143.38	123.52	95.41
Nov.	.....	138.50	118.09	88.66
Dec.	.....	117.76	139.85	102.49
Avg	.....	147.68	120.01	100.00

Material Handling Institute Inc.



	Shipments—Units		
	1957	1956	1955†
Jan.	149,600	163,500	153,400
Feb.	161,600	190,200	186,500
Mar.	179,400	194,300	218,100
Apr.	168,800	176,300	183,200
May	156,200	179,400	187,700
June	155,300	185,100	204,000
July	137,400	158,800	146,300
Aug.	182,600	203,200	220,000
Sept.	197,400	206,400	219,100
Oct.	.....	219,100	210,300
Nov.	.....	161,100	184,400
Dec.	.....	138,700	153,600
Totals	.....	2,176,100	2,226,600

*Preliminary.
†Excluding built-ins.
Gas Appliance Mfrs. Assn.

level—and it is scheduled to do that—about another three points will be added to the composite. Electric energy production also will add about three points to the total if it maintains its current year-to-year advance of 3 per cent.

Freight carloadings will take a tumble during the first week in December as shippers bring the Great Lakes ore shipping season to an early halt. The index's loss will be about 3 points. Steel production is still showing weakness, and it may get worse before it gets better. If so, another point will be lost. Right now, it looks like the best that can be expected in the index the rest of this year is about 154 or 155, compared with the all-time high of 168 set last December.

Cost of Holding Your Own

Construction in 1958 will total $49.6 billion and set the second best annual record for physical volume, predict the Commerce and Labor Departments. During the record physical volume year of 1955, valuation was about $43 billion. In other words, it will require a 15 per cent greater outlay next year simply to match the pace of three years prior.

Residential building and highway construction will be the two big guns in 1958, although almost all other types of construction will rise moderately or at least match current levels. Only private industrial and military building are expected to decrease appreciably.

Trends Fore and Aft

- During the first ten months of 1957, corporations made cash dividend payments of over $9 billion, compared with about $8.7 billion during the year-ago period, the Commerce Department reports.
- Business failures in October were lower in number (1122), liabilities ($47.4 million), and rate per 10,000 (52) than in the corresponding 1956 month, says Dun & Bradstreet Inc. For the first ten months of the year, 1957 failures outnumber those of the similar 1956 period by 781.
- The wholesale price index in October declined for the second successive month, a feat accomplished last in the May to July period of 1956. It now rests at 117 7 (1947-49 = 100) for all commodities and 125.7 for the other than farm and food category.

Tempilstik°

THE CRAYONS THAT TELL TEMPERATURES

IT'S THIS SIMPLE

- Select appropriate TEMPILSTIK° for the working temperature you want.
- Mark your workpiece with it.
- The TEMPILSTIK° mark melts as soon as its temperature rating has been reached.

Accuracy within 1% of rated melting point.

Also available as TEMPILAQ° (liquid form) and TEMPIL° PELLETS

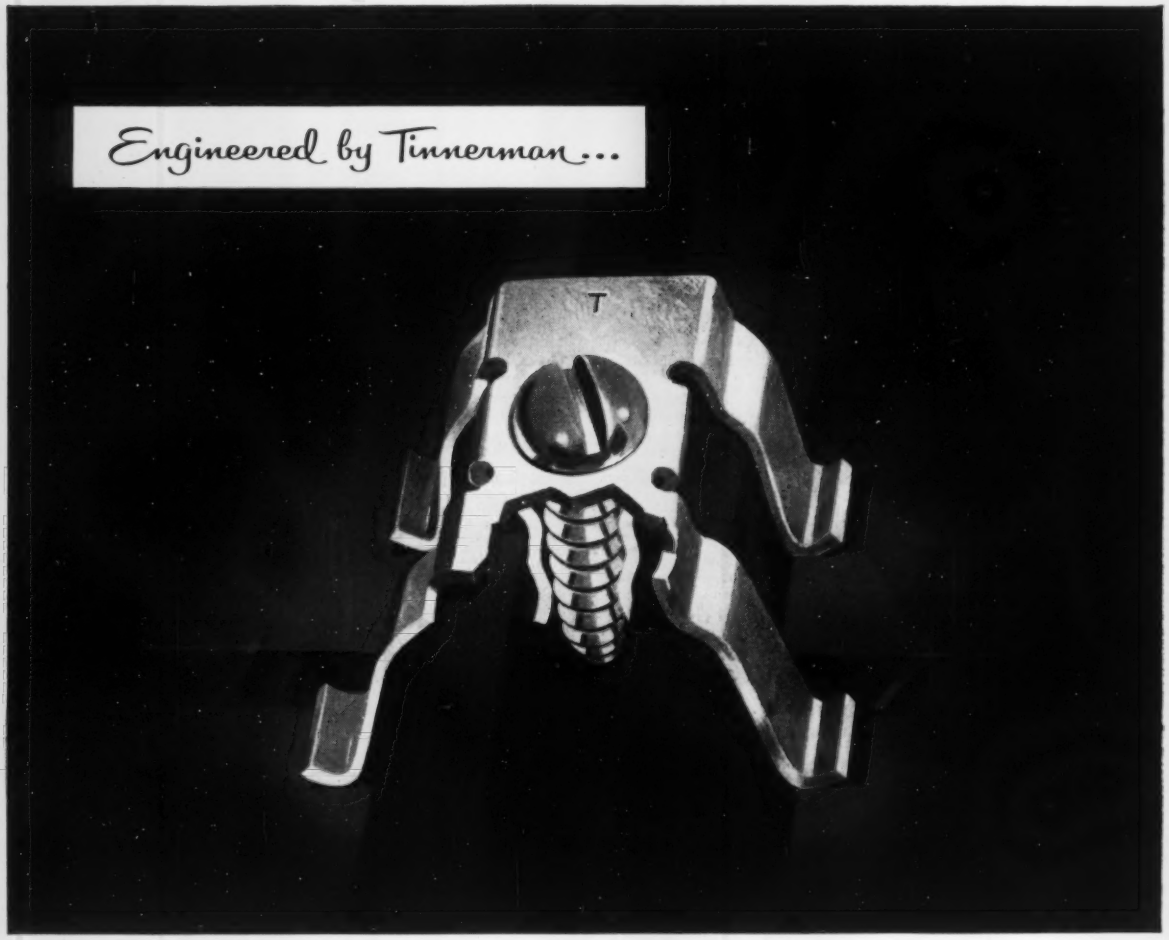
63 different temperature ratings available

For information and samples, send coupon

Tempil° CORPORATION
134 West 22nd St., New York 11, N.Y.
Send information on:

☐ TEMPILSTIK° ☐ TEMPILAQ°
☐ TEMPIL° PELLETS
☐ Send booklet "How Temperatures are Measured"
☐ Send sample pellets for _____°F temperature

Name_____
Address_____
City_____
State_____



6-fingered **SPEED CLIP**®
holds glass panels tight, saves 46%!

This special SPEED CLIP fastens glass panels to aluminum extrusions with a grip that prevents slippage. Heat stays in, rain stays out of greenhouses and similar glass structures. Working closely with engineers of the Metropolitan Greenhouse Mfg. Corp., Brooklyn, Tinnerman developed this unique fastener that saves almost one-half the cost of former less effective assembly methods!

Installation is fast and simple. Two overlapping glass panels are positioned against the extrusion. A screw driven into the spring-steel SPEED CLIP spreads the two center fingers outward to grip the inner walls of the extrusion. No secondary fastening devices required—SPEED CLIPS hold tight, yet are easily removed to permit replacement of glass.

This is another example of a fastener engineered by Tinnerman to satisfy special, complicated fastening problems. A Fastening Analysis of your products may produce a similar cost-cutting solution. See your Tinnerman representative soon.

TINNERMAN PRODUCTS, INC.
BOX 6688 • DEPT. 12 • CLEVELAND 1, OHIO

TINNERMAN

Speed Nuts®

FASTEST THING IN FASTENINGS®

Canada: Dominion Fasteners, Limited, Hamilton, Ontario. Great Britain: Simmonds Aerocessories, Limited, Treforest, Wales. France: Simmonds, S. A., 3 rue Salomon de Rothschild, Suresnes (Seine). Germany: Hans Sickinger GmbH "MECANO", Lemgo-I-Lippe.

J. HERBERT LUND
Champion Rivet div. post

V. J. EBERL
Robertshaw-Fulton supt.

WAYNE J. NEAGLES
Turchan gen. sales mgr.

HAROLD F. FALK
Falk Corp. president

Champion Rivet Co., Cleveland, appointed **J. Herbert Lund** sales manager of its Upset Forgings Div. He was vice president-general sales manager, Kropp Forge Co. **David J. Champion**, sales manager, was promoted to general sales manager of the company. **Joseph DeSanto, Robert Casick**, and **Dick Capuano** were added to the Chicago sales force.

V. J. Eberl was made plant superintendent, **Robertshaw Thermostat Div.**, Robertshaw-Fulton Controls Co. His office is in Youngwood, Pa. Mr. Eberl was plant manager for Wisconsin Metal Products.

Ray W. Heiden was elected president and general manager, **Progressive Welder Sales Co.**, Pontiac, Mich. He succeeds the late **Fred H. Johnson**, founder of the company. **Harry S. Rose**, former chief engineer, was made vice president-national sales manager.

D. B. Benedict was elected a vice president of **Union Carbide Corp.**, New York. He was president of Union Carbide Chemicals Co., a division, and is succeeded by **E. E. Fogle. H. D. Kinsey** was named president of the newly formed **Union Carbide Olefins Co.**, also a division, which will handle production and sale of hydrocarbon products.

Edmond D. Pieri was promoted to manager-sales engineering, **Stran-Steel Corp.**, Detroit. He is replaced as manager of architectural products sales by **Robert V. Longcor.**

Wayne J. Neagles was made general sales manager, **Turchan Follower Machine Co.**, Dearborn, Mich. He will co-ordinate the sales, service, and engineering departments. Mr. Neagles joined Turchan in 1952 and was promoted to sales engineer in 1954.

H. D. Phillips was elected president of Consolidated Foundries & Mfg. Corp.'s **Adirondack Steel Casting Co.**, newly acquired division at Watervliet, N. Y., formerly Adirondack Foundries & Steel Inc. **Fred W. Sherman**, former president of Adirondack, was elected vice president of Consolidated Foundries, which retains him in a consulting capacity.

John D. Kuechle was elected vice president, **Louis Allis Co.**, Milwaukee. Formerly works manager, he is now in charge of manufacturing.

Brent L. Phillips was made production control manager of the Des Moines, Iowa, implement plant of **Ford Motor Co.** He was metals control supervisor in Ford Motor Co.'s production programming and control office.

Edward Ryan was made works manager, instrument division, **Sterling Precision Corp.**, Port Washington, N. Y. He was plant superintendent.

Jeffrey Cohen was made chief development engineer, **Topp Mfg. Co.**, Los Angeles, a division of Topp Industries Inc. He was formerly with Hughes Aircraft Co.

Harold F. Falk was elected president, **Falk Corp.**, Milwaukee, to succeed his late father, **Harold S. Falk. Matthew A. Carpenter** was elected chairman. Mr. Falk was executive vice president. Mr. Carpenter, since 1953, has been chairman of the executive committee.

Jones & Laughlin Steel Corp.'s strip steel division appointed **J. G. Wortley** general manager, Kenilworth, N. J., plant; **W. H. Rees**, assistant general manager-sales, strip steel division, Youngstown. Mr. Wortley, former general sales manager at Kenilworth, succeeds **J. G. Berry**, resigned. Mr. Rees was New York district sales manager.

Lewis J. Cox, executive vice president, was elected president of **Iron Fireman Mfg. Co.**, Cleveland.

Allis-Chalmers Mfg. Co., Milwaukee, elected three vice presidents: **P. F. Bauer**, managing director, Allis-Chalmers International; **E. J. Mercer**, general manager, construction machinery division; and **William M. Wallace**, general manager, general products division.

George E. Spaulding Jr. was made director of research, heading an expanded research and development program at **Electric Auto-Lite Co.**, Toledo, Ohio.

Republic Steel Corp. promoted **Kenneth F. Waggener** to assistant superintendent of its bessemer rolling and finishing mills in Youngstown. He is succeeded by **F. A. Court** as assistant superin-

E. W. ENGEL
Dodge production control

JOHN B. KENDALL
Delta Welder v. p.

ROBERT W. CARLSON
Minnesota Rubber president

tendent of the bessemer converters.

E. W. Engel was appointed production control manager, **Dodge Div.**, Chrysler Corp., Detroit. Heading this new department, Mr. Engel will control the flow of all production materials. **S. L. Dopp** was named production control manager, Detroit plant.

John B. Kendall was elected vice president, **Delta Welder Corp.**, Detroit. He was in charge of the Ford Motor Co.'s Chicago stamping plant.

Daniel C. McCarthy Jr. was named to the new post of director-manufacturing planning for **Chrysler Corp.**, Detroit.

Harold J. Bergum joined **Nylok-Detroit Corp.** as plant manager in charge of new manufacturing facilities at Troy, Mich. He was formerly with Ford Motor Co.

William G. Skinner joined **Essex Wire Corp.** as manager of its Ft. Wayne, Ind., magnet wire plant.

Robert H. Kitson was made manager of the Beverly Hills, Calif., district sales office of **Consolidated Electrodynamics Corp.** He is succeeded as manager of the San Diego, Calif., district sales office by **S. R. Wyzenbeek Jr.**

J. Ranald Fox, works manager of the alumina plant at **Aluminum Co. of America's** Point Comfort, Tex., operations, was named assistant general manager, refining division. He is succeeded by **A. B. Kaltwasser**, former alumina plant production manager.

Robert W. Carlson, vice president-general manager, **Minnesota Rubber & Gasket Co.**, Minneapolis, was elected president to succeed **George E. Carlson**, now chairman.

Westinghouse Electric Corp., Pittsburgh, appointed three marketing directors. Named to the newly created posts are: **S. F. Davies**, general products divisions; **L. H. Loufek**, apparatus products; and **R. M. Wilson**, defense divisions.

Hollis G. McLaughlin was made manager of industrial engineering, aluminum division, **Kaiser Aluminum & Chemical Corp.**, Oakland, Calif.

E. B. Pool, research engineer for **Edward Valves Inc.**, East Chicago, Ind., was promoted to chief research engineer for the company, subsidiary of Rockwell Mfg. Co. **Wilbert G. Hegener** was made research and engineering co-ordinator. **Harold N. Myers** was made research metallurgist. **Robert A. Seethaler**, formerly Pittsburgh district sales manager, transferred to East Chicago to fill the new post of sales engineering liaison executive.

Herbert C. Smith was named sales manager for **Westinghouse Electric Corp.'s** Micarta Div., Hampton, S. C. Formerly with the company's lighting division in Cleveland, he succeeds **S. F. Davies**, appointed director of marketing, general products group.

Robert L. Hodapp was named field engineer in the Detroit district for **General Plate Div.**, Metals & Controls Corp. He was sales manager, Lyall Electric Inc.

Arthur W. Ackerman Jr. was named assistant to the executive vice president, **Huck Mfg. Co.**, Detroit.

Howard C. Carless was made assistant general manager of the Terre Haute, Ind., Works of **Allis-Chalmers Mfg. Co.**

Bruce M. Robinson joined the sales department of **Michigan Seamless Tube Co.**, South Lyon, Mich. He was resident representative for C. A. Roberts Co. in Rockford, Ill.

Fred Thearle was named chief en-

A. J. SLATER

C. H. H. WEIKEL

T. A. McLAY

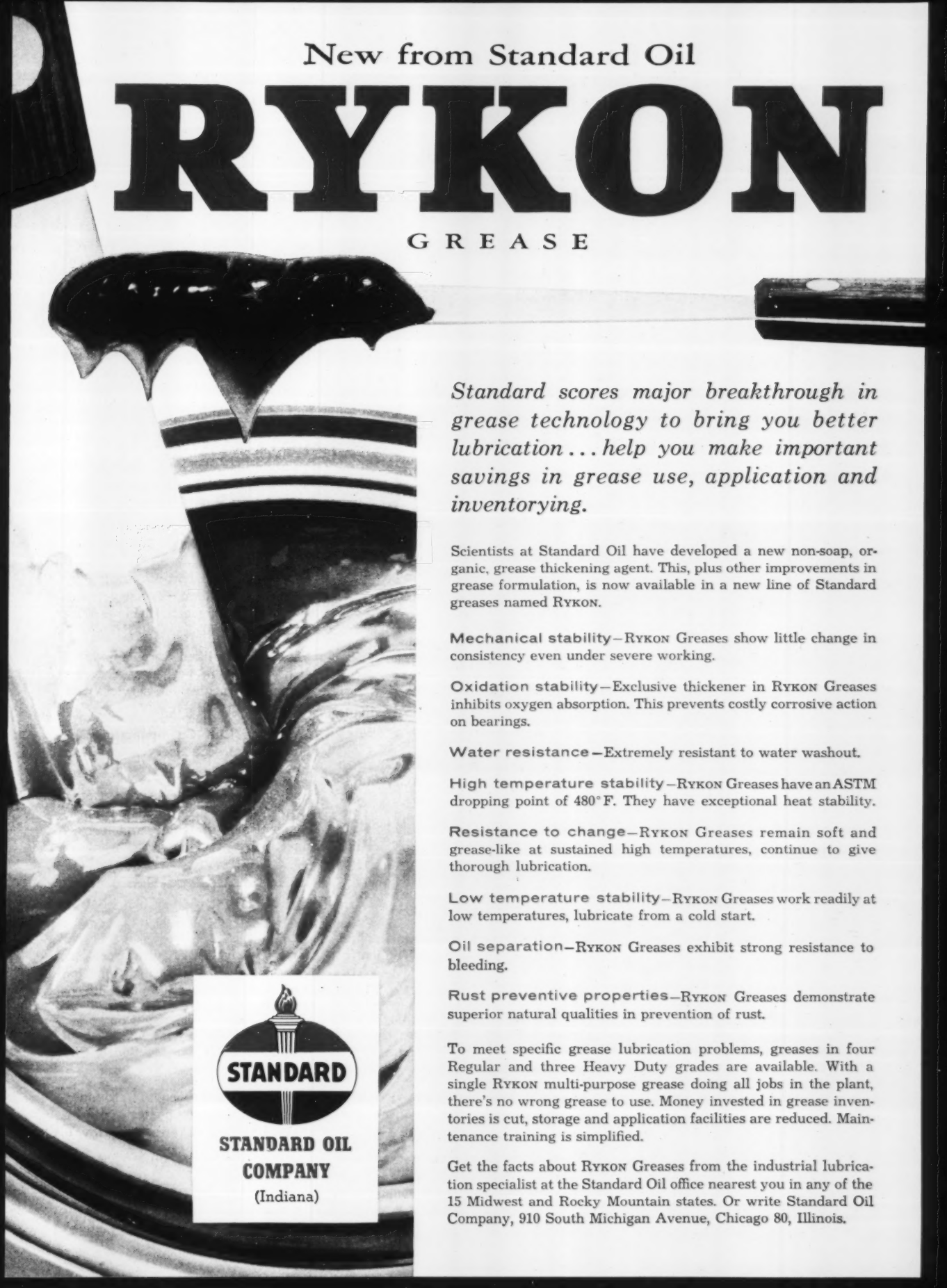
assistants to the president at Bethlehem Steel

Bethlehem Steel Co., Bethlehem, Pa., appointed three assistants to the president. They are: **A. J. Slater**, formerly assistant vice president-finance; **C. H. H. Weikel**, formerly manager, commercial research and industrial development; **T. A. McLay**, secretary to president.

New from Standard Oil

RYKON

GREASE



Standard scores major breakthrough in grease technology to bring you better lubrication... help you make important savings in grease use, application and inventorying.

Scientists at Standard Oil have developed a new non-soap, organic, grease thickening agent. This, plus other improvements in grease formulation, is now available in a new line of Standard greases named RYKON.

Mechanical stability—RYKON Greases show little change in consistency even under severe working.

Oxidation stability—Exclusive thickener in RYKON Greases inhibits oxygen absorption. This prevents costly corrosive action on bearings.

Water resistance—Extremely resistant to water washout.

High temperature stability—RYKON Greases have an ASTM dropping point of 480° F. They have exceptional heat stability.

Resistance to change—RYKON Greases remain soft and grease-like at sustained high temperatures, continue to give thorough lubrication.

Low temperature stability—RYKON Greases work readily at low temperatures, lubricate from a cold start.

Oil separation—RYKON Greases exhibit strong resistance to bleeding.

Rust preventive properties—RYKON Greases demonstrate superior natural qualities in prevention of rust.

To meet specific grease lubrication problems, greases in four Regular and three Heavy Duty grades are available. With a single RYKON multi-purpose grease doing all jobs in the plant, there's no wrong grease to use. Money invested in grease inventories is cut, storage and application facilities are reduced. Maintenance training is simplified.

Get the facts about RYKON Greases from the industrial lubrication specialist at the Standard Oil office nearest you in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD

STANDARD OIL COMPANY
(Indiana)

PAUL FISCHER
Hyster plant manager

DON W. BRANNING
American Broach manager

ARTHUR S. HUDSON
heads Chrysler marine div.

DOGAN H. ARTHUR
Titeflex v. p.-sales

PHILIP J. BERG
Dravo div. sales manager

RICHARD H. THOMPSON
Climax Molybdenum post

gineer, **Transland Co.**, Torrance, Calif.

Dogan H. Arthur was elected vice president-sales, **Titeflex Inc.**, Springfield, Mass., subsidiary of Atlas Corp. He was aircraft sales manager of Aeroquip Corp.

Philip J. Berg was named sales manager, engineering and construction department, machinery division, **Dravo Corp.**, Pittsburgh. He was manager of general construction sales.

A. R. Baldwin joined **Republic Steel Corp.'s** sales staff as a specialist on wire products and sheets. He is in Birmingham and covers that district. He also has contacts in Texas and Oklahoma.

Eugene Ross joined **ESS Instrument Co.**, Bergenfield, N. J., as sales manager.

Arthur W. Gilbert, vice president, was elected president, **Triplex Supply Co.**, Milwaukee. He succeeds **Monroe W. Mund,** resigned.

Richard H. Thompson was made manager-foundry sales, **Climax Molybdenum Co.**, New York. He held a similar post with American Car & Foundry Div., ACF Industries Inc.

Robert M. Morris and **Harold I. Martin** were elected vice presidents, **Swindell - Dressler Corp.**, Pittsburgh. Newly appointed assistant vice presidents are **Owen Cross** and **Jerome Gordon.**

Charles Proctor was named chief production engineer for **Topp Mfg. Co.**, Los Angeles.

William H. McCarty Jr. was made Boston district sales manager, **Latrobe Steel Co.**, replacing the late **Robert Rose.** Mr. McCarty was a salesman for the area.

Harry T. Jeter was made vice president-manufacturing, **Longren Aircraft Co.**, Torrance, Calif.

Thomas A. Fribley, secretary, was elected a vice president of **Cleveland Cap Screw Co.**, Cleveland.

Paul Fischer, chief methods engineer, **Hyster Co.**, Portland, Oreg., was named manager of the Portland manufacturing plant, responsible for manufacturing, personnel, traffic, purchasing, and plant engineering. **Fay Brainard** was made chief methods engineer.

Don W. Branning was made manager, **American Broach & Machine Div.** of Sundstrand Machine Tool Co., at Ann Arbor, Mich. He was manager of the Detroit sales office.

Arthur S. Hudson, former assistant comptroller, **Chrysler Corp.**, Detroit, was appointed president of the company's marine and industrial engine division.

Hugh I. Gillham was made chief engineer, **Trecker Aircraft Corp.**, Milwaukee. He was a senior design engineer with the Georgia division of Lockheed Aircraft Corp.

L. C. Simmons was appointed assistant executive vice president-accounting, **United States Steel Corp.**, Pittsburgh. He is succeeded as vice president-accounting by **Russell M. Braund,** formerly comptroller of American Steel & Wire Div., Cleveland.

Pettibone Mulliken Corp. appointed **Len Wichman** eastern regional manager for sales and service, with headquarters in New York.

American Buff Co. appointed **Bob Hulland** sales and service engineer for the Syracuse, N. Y., area.

Mid-Century Instrumatic Corp., New York, named **John M. Embree** applications manager and assistant to the president.

OBITUARIES...

Erle V. Daveler, 71, vice president, **American Zinc, Lead & Smelting Co.**, New York, and chairman of the **Mesabi Iron Co.**, died Nov. 11.

Charles P. Cutler, 62, manager of **Republic Steel Corp.'s** South Chicago district, died Nov. 8.

Joseph E. Lansberg, 68, founder-president, **Los Angeles Iron & Steel Co.**, Los Angeles, died Nov. 6.

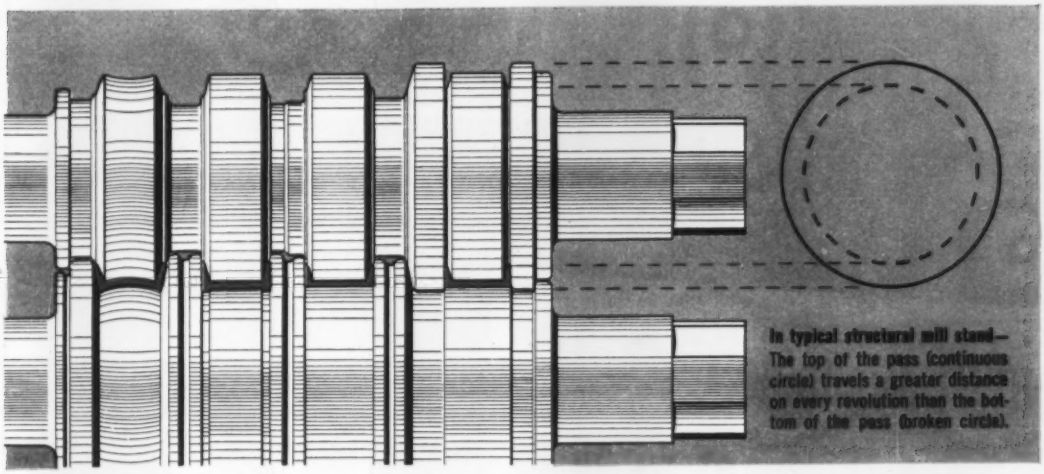
John J. Dowdle III, 39, a vice president, **Great Lakes Carbon Corp.**, New York, died Nov. 11.

TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

You get your nickel's worth in structural rolls



In typical structural mill stand—The top of the pass (continuous circle) travels a greater distance on every revolution than the bottom of the pass (broken circle).

With the large rolls used in beam, channel and other structural mills, excessive side wear in the passes is probably the most common cause of short runs between redressings. The reason, naturally, is the variation in peripheral speed at various pass depths. For example, the top of a typical pass on a 26" diameter roll may travel as much as a foot more on each revolution than the bottom of the pass. The slippage that has to occur aggravates this side wear in the passes.

Thus, structural finishing rolls should be as hard as practical, with the hardness uniform from the surface in. While Mack-Hemp produces several types of rolls widely used in structural mills, the one which offers the best wearing properties—and the one we recommend for all large mills where wear is severe—is the nickel-alloy steel "M-H Midland Supermetal" roll.

The three virtues of nickel—The more carbon in steel, the higher its hardness can be raised by heat treatment. But, carbon also raises brittleness. Strength and resistance to shock and impact suffer.

However, as nickel is added, the strength of the steel increases. Thus, the introduction of nickel raises the permissable level of carbon, since the nickel counterbalances the embrittling effect of the carbon.

Because of its graphitizing property, nickel contributes two other virtues to the "Supermetal" roll. The graphite acts as a lubricant, reducing the rate of wear caused by the slippage in the pass. Secondly, the graphite formed due to the presence of nickel is very fine and well-dispersed, producing a structure that provides a smooth working surface.

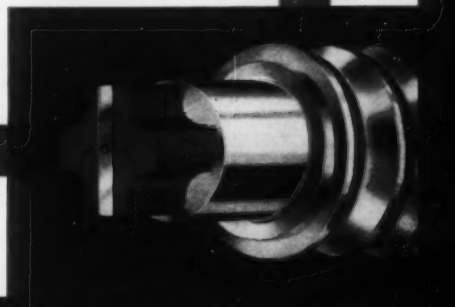
The greatest wear resistance—Because of these properties conferred by nickel, Mack-Hemp "Supermetal" represents the best solution yet found to the wear problem created by severe operating conditions in structural mills. However, several other Mack-Hemp roll compositions give excellent results where conditions are less severe. For more detailed information on this—or any other—problem of roll selection, telephone or write us today. There's no obligation.

MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery



Modern electronically controlled slitters give you exact, clean-edged widths. Speeds up to 700 linear feet per minute are another factor in prompt service.

Anaconda Aluminum Coiled Sheet

ALUMINUM COILED SHEET produced to the high standards of quality and uniformity maintained by The American Brass Company is now available for prompt shipment from our Torrington Division to all points in the United States.

It is rolled on the most modern, high-speed equipment, X-ray controlled to close tolerance in gage. High-speed, electronically operated slitters give exact widths with clean edges on evenly and tightly wound coils. Latest annealing furnaces—with controlled atmosphere and temperature—provide high uniformity of metal structure to meet specified mechanical-property limits.

IN THESE WIDTHS: Maximum 28 inches
Minimum $\frac{3}{8}$ inch

IN THESE THICKNESSES: Maximum 0.064 inch
Minimum .006 inch

COIL WEIGHTS: Up to 100 lb. per inch of width

ARBOR SIZES: 4, 6, 8, 10, 12, 16, and 20 inches in diameter

ALLOYS: 1100, 3003, 3004, 5005, 5050, 5052

TEMPERS: Alloy Nos. 1100, 3003, 5005
—O, —H12, —H14, —H16. —H18
Alloy Nos. 3004, 5005, 5050, 5052
—O, —H32, —H34, —H36, —H38

FOR IMMEDIATE ACTION, call The American Brass Company Office nearest you. The American Brass Company, Waterbury 20, Conn.

5796

ANACONDA®
ALUMINUM COILED SHEET
Made by The American Brass Company

Turns Huge Drum

Hardinge finishes one of largest units ever machined on a lathe and shipped as a single piece

THE balling drum shown in the accompanying photograph is believed to be one of the largest pieces of equipment ever machined on a lathe and shipped as a single piece. The builder, Hardinge Co. Inc., York, Pa., had to obtain special clearance from the Pennsylvania Railroad to ship the unit.

It is 40 ft long, has an inside diameter of 12 ft, and its outside diameter, when installed in a West Virginia sintering plant, will be 13 ft 8 in.

End Use—The unit will revolve about its center axis on four supporting rollers, at a slight angle to the horizontal. The action is similar to that of a rotary kiln—but much faster.

From 180 to 330 tons of material per hour will be introduced at the uphill end of this drum. It will be converted into small balls or pellets by the combined rotating and scraping action of a reciprocating "cutting bar" inside the shell.

Hardinge is building a balling drum that's 50 ft long and has an inside diameter of 12 ft for a similar operation near Detroit.

Acquires Machinery Lines

Taylor-Winfield Corp., Warren, Ohio, maker of electric welders, purchased the lines of metal forming and work handling machinery formerly built by Struthers-Wells Corp., Titusville, Pa. The acquisition permits Taylor-Winfield to design and build co-ordinated production lines which process coils or strip into the finished welded product. Struthers-Wells will continue to make heavy forgings, boilers, welded equipment, and processing equipment for the chemical and petroleum industries.

Forms Machine Tool Firm

Southeast Machinery Co. has been organized at 1525 S. Andrews Ave., Ft. Lauderdale, Fla. George Habicht Jr., chairman of Marshall & Huschart Machinery Co., Chicago, is president of the firm. Other officers are: Secretary, R. W. Banfield. Motch & Merryweather Machinery Co., Cleveland; and treasurer, Thomas R. Rudel, Rudel Machinery Co. Inc., New York. Sales engineering and service operations of Southeast will be in charge of E. L. Eveleth, vice president and general manager.

Extruder Buys Equipment

Detroit Gasket & Mfg. Co., Detroit, has purchased a 1500-ton self-contained aluminum extrusion press and a 15-ton hydraulic stretcher and straightener from Sutton Engineering Co., Pittsburgh. The equipment will be installed at Detroit Gasket's Extruded Metals Div., Belding, Mich.

Gets Ore Bridge Contract

Inland Steel Co., Chicago, has awarded Wellman Engineering Co., a subsidiary of McDowell Co. Inc., Cleveland, a contract for a new ore bridge for its Indiana Harbor (Ind.) Works. The bridge will increase Inland's ore handling capacity to meet the needs of a new ore screening and sintering plant being designed by McDowell's Dwight-Lloyd Div. Initial capacity of the sintering machine will be 4000 tons per day of sinter product. Engineered to handle up to 6000 tons a day, it will supply six of Inland's blast furnaces with a beneficiated burden. The improved charge of screened ore and sinter is expected to result in substantial improvement in the plant's ironmaking capacity.

Improves Pump Production

U. S. Steel Corp. s Oil Well Supply Div. has placed in operation one of the most modern centrifugal pump production lines in the nation. Equipment installed at the Wilson-Snyder Works, Braddock, Pa., is designed to permit the machining, assembling, testing, and shipping of centrifugal pumps in one continuous operation, says C. H. Stewart, plant manager. The facilities include recording and metering equipment, balancing machines, and special calibrated motors to test volume and water pressure. All essential parts of the pumps subject to fluid contact are constructed of high alloy metals to assure maximum efficiency.

CONSOLIDATIONS

American Metal Co. Ltd. and **Climax Molybdenum Co.**, both of New York, will merge, subject to approval by stockholders. Harold K. Hochschild will be honorary chairman of the surviving corporation, American Metal Climax Inc. Other officers will be: Chairman, Arthur H. Bunker; vice chairman, Walter Hochschild; and president, Hans A. Vogelstein.

Mercast Corp., New York, acquired **Gray & Huleguard Inc.**, Los Angeles, supplier of alternators, actuators, electric motors, and hydraulic servounits for use in missiles, jet aircraft, and electronic devices.

Harris-Intertype Corp., Cleveland, purchased the **Gates Radio Co.**, Quincy, Ill., electronics manufacturer and producer of commercial broadcasting equipment.

King-Seeley Corp., Ann Arbor, Mich., purchased **Queen Products Inc.**, Albert Lea, Minn., and its associated company, **Albert Lea Building Corp.** King-Seeley is a leading supplier of speedometers, gages, instrument panels, and other equipment for the automotive industry. It also makes power tools, domestic fans, and electrical control devices. Queen Products makes finishing and deburring equipment, icemaking machines, camping

equipment, and oil and gas heaters for domestic space heating.

NEW PLANTS

American Can Co., New York, formally opened its canmaking plant at Blue Ash, Ohio. The 240,000 sq-ft facility has a manufacturing capacity of about 200 million metal containers a year.

Latrobe Steel Co., Latrobe, Pa., is constructing a warehouse at 1230 Expressway Drive, Toledo 8, Ohio. It will enable the firm to offer a wider range and greater depth of stock sizes of tool and die steels, tool bits, drill rod, and flat ground die steel.

Louis Allis Co. formally opened its $2.5-million factory and office additions in Milwaukee. The 121,000 sq-ft plant is designed for the production of large motors (up to 1500 hp).

Olin Mathieson Chemical Corp., New York, will construct atomic fuel facilities at Montville, Conn., for its Nuclear Fuels Div. To be completed next spring, the plant will assemble nuclear fuel cores. The city of Norwich, Conn., has agreed to construct a pipeline and supply up to 500,000 gallons of water daily.

Liberty Mfg. Co., Youngstown, is building a 40,000 sq-ft office and factory building for the manufacture of electronic parts for electronic computers and similar installations. Estimated cost: More than $300,000.

Burgmaster Corp., Small Tool Div., Burg Tool Mfg. Co. Inc., Gardena, Calif., opened a plant at 13226 S. Figueroa St., Gardena, Calif.

Badger Northland Inc., Kaukauna, Wis., plans to build a plant at Cortland, N. Y. The firm makes barn cleaning equipment and silo unloaders.

Paulsen-Webber Cordage Corp., New York, purchased the plant and physical assets of **Sunbury Wire Rope Mfg. Co. Inc.**, Sunbury, Pa. The corporate stock of Sunbury was not involved in the transaction.

Gardner-Denver Co. is operating two new metallurgical laboratories. One will serve the plants at the firm's headquarters in Quincy, Ill.; the other, the Keller Tool Div. plant, Grand Haven, Mich. Gardner-Denver makes pumps, rock drills, compressors, and air tools.

ASSOCIATIONS

National Foundry Association, Chicago, elected these officers: President, A. G. Hall, Nordberg Mfg. Co., Milwaukee; vice president, R. C. S. Potter, Chemung Foundry Corp., Elmira, N. Y.; and treasurer, W. G. Greenlee, Greenlee Foundry Co., Chicago. Charles T. Sheehan is executive secretary.

Metal Treating Institute, New Rochelle, N. Y., elected these officers: President, K. U. Jenks, Lindberg Steel Treating Co. Inc., Melrose Park, Ill.; vice president, A. T. Ridinger, Metallurgical Inc., Minneapolis; and treasurer, L. G. Field, Greenman Steel Treating Co., Worcester, Mass.

New officers of the **Conveyor Equipment Manufacturers Association** are: President, E. P. Berg, Link-Belt Co., Chicago; vice president, J. B. Nordholt Jr., Webster Mfg. Inc., Tiffin, Ohio; treasurer, H. E. Murken, Hewitt-Robins Inc., Stamford, Conn.; and secretary, L. J. Johnson, Mathews Conveyer Co., Ellwood City, Pa. R. C. Sollenberger was re-elected executive vice president.

A group of private industrial and utility companies has organized the **American Nuclear Power Associates**, Raytheon Research Laboratories, Waltham, Mass. Present members are: Burns & Roe Inc. (architects-engineers), New York; Clark Bros. Co., a division of Dresser Operations Inc. (compressor and blower manufacturer), Olean, N. Y.; Griscom-Russell Co., subsidiary of General Precision Equipment Corp. (heat exchange equipment manufacturer), Massillon, Ohio; Rockland Light & Power Co., Nyack, N. Y.; and Raytheon Mfg. Co., Waltham, Mass.

Clinton E. Smith, Pratt & Whitney Co. Inc., West Hartford, Conn., has been elected president of the **Solid Carbide Institute**, New York.

William S. North, Union Special Machine Co., Chicago, has been nominated for the presidency of the **Illinois Manufacturers' Association.** Other nominations are: First vice president, Merle R. Yontz, Le Tourneau-Westinghouse Co., Peoria, Ill.; second vice president, Harold B. Smith, Illinois Tool Works, Chicago; and treasurer, Leonard C. Ferguson, Western Newell Mfg. Co., Freeport, Ill.

American and Canadian firms which repair machinery and metal parts used by heavy industries have organized a trade group, the **American Metal Repair Association**, 101 Investment Bldg., Pittsburgh 22, Pa. Officers are: R. L. Rectenwald, Maintenance Engineering Corp., Pittsburgh; vice president, S. John Oeschle Jr., Metalweld Inc., Philadelphia; and treasurer, George Jackman, Metal Locking Service, Buffalo. Charles A. Kenny is executive secretary.

NEW OFFICES

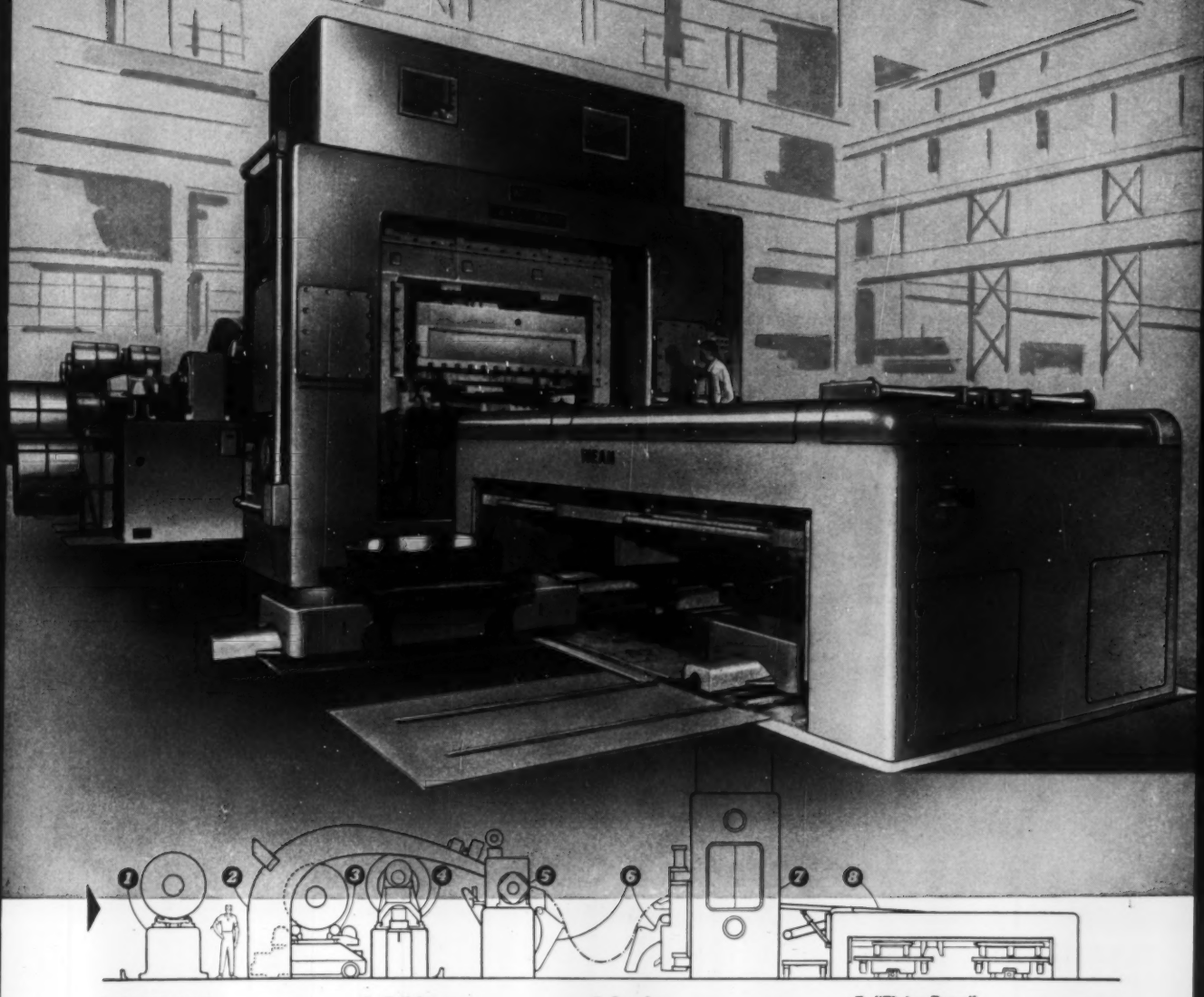
International Iron & Metal Co. Ltd., Hamilton, Ont., opened a branch office at 7881 Decaire Blvd., Montreal, Que. Representatives at the new office are Patrick O'Henaghan and Stanley Safe.

NEW ADDRESSES

Carboline Co., producer of corrosion resistant protective coatings and linings, moved its general office and research laboratory to a new building at No. 23 Hanley Industrial Center, St. Louis 17, Mo.

M. A. Ford Co. moved to 1545 Rockingham Rd., Davenport, Iowa.

Stacor Equipment Co. moved into its new plant at 285 Emmet St., Newark 5, N. J.



1. Ready stand
2. Threading arms
3. Coil buggy
4. Cone-type Uncoiler
5. Leveler
6. Threading tables
7. "Flying-Press"
8. Automatic Piler

"Flying Press" Production Line

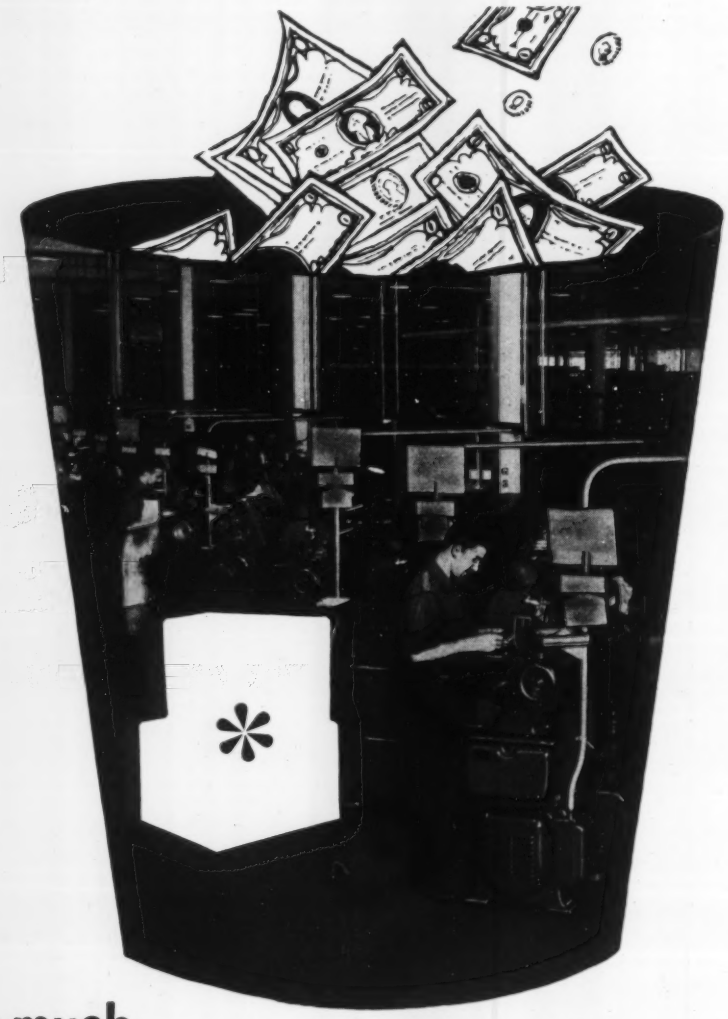
250 ton press line quadruples production of large heavy gauge parts

Dramatic proof of new production horizons is seen in the performance of this 250 ton "Flying-Press" production line engineered by Wean. Large heavy gauge automotive parts, formerly produced on modern presses, at rates up to 20 strokes per minute, are now produced on this Wean line at 90 strokes per minute.

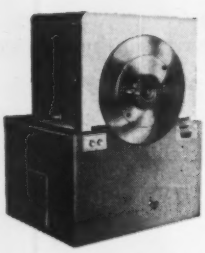
The press is a 250-84-60 "Flying-Press." All components, from ready stand to stacking table, were engineered by Wean to work together as a single unit. Thus, the complete line is capable of producing at maximum press speeds. Consider, for a minute, how such production equipment can lower your per-unit manufacturing costs.

20 tons or 300 tons, whatever your press requirements, you will want the complete story on the "Flying-Press" and related units. Write today for your copy of the Wean "Flying-Press" Brochure.

Wean Equipment Corporation
CLEVELAND 17, OHIO

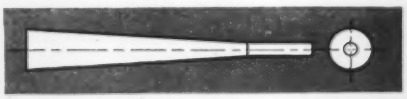


How much are you paying for the machine that isn't there?



Because a Torrington Rotary Swaging Machine shapes work by reduction instead of cutting metal away, you can often save on both material and time by swaging parts you are now machining.

This part, for example, was formerly turned from brass bar stock. When swaged from tubing, stock weight was reduced 83%, and the work cycle cut from 86 seconds to 12 seconds!



You can put many operations on a Torrington Swager—pointing, tapering, reducing, sizing, forming inside contours and threads. With sizable savings on operations like these, your swaging machine will pay for itself in a short time.

See for yourself what swaging is and what it can do. Let us show you our new, 20-minute, full-color film on swaging. And write for our catalog on Torrington Rotary Swaging Machines.

THE TORRINGTON COMPANY • Swaging Machine Division
150 North Street, Torrington, Conn.

TORRINGTON ROTARY SWAGING MACHINES

Technical Outlook

HOW GOOD IS STREAM DEGASSING?— The process reduces hydrogen content to less than 1.5 ppm (it may be as much as 8 ppm if untreated) in alloy steel forging ingots; ductility is increased 15 per cent or more, K. C. Taylor, manager stream degassing, F. J. Stokes Corp., Philadelphia, told the Second International Metal Congress in Chicago. Ingots weighing 250 tons are being poured. Cost of stream degassing is less than 1 cent per pound, compared with about 20 cents per pound for consumable electrode melting and 40 cents per pound for induction melting.

TOPS IN ELECTRODES?— The new Easyarc 30 deposits 17 lb an hour, says the maker, Air Reduction Sales Co., New York. An extra heavy coating of iron powder and increased machine settings speed up deposition. Mechanical properties are equal to AWS E6020-6030 specifications. It will handle ½-in. fillets in one pass. Applications include large weldments, frames, machine bases, and refinery equipment.

NEW ALLOY— Hoskins Mfg. Co., Detroit, has a new iron-chromium-aluminum alloy for moderately high temperature applications, such as toasters, hot plates, and other industrial heating devices with continuous operating temperatures not exceeding 2150° F. Called Alloy 815, it also may be used for certain cold resistor applications, such as defroster units, contact switches, and rheostats.

INFORMATION CENTER— Data on the effects of nuclear radiation on materials and systems for atomic powered aircraft will be gathered and distributed by Battelle Memorial Institute, Columbus, Ohio. An Air Force project, it'll be called the Radiation Effects Information Center. Its purposes: To support the Air Force's nuclear propelled aircraft program and offer other services.

HERE'S ONE TO WATCH— A new ceramic tool offers exceptional longevity and speeds. It lasted 2 hours 5 minutes on a job that ruined conventional tools in seconds. Cuts have been taken at speeds as high as 2200 sfpm. Bolt holes in one workpiece did no damage to the ceramic. Made by Norton Co., Worcester, Mass., the new tool can take off seven times as much metal as its predecessor.

HIGH CONDUCTIVITY— Aluminum conductors with minimum conductivity of 62 per cent without reduction in tensile strength are available from Alcoa. The present industry standard for minimum conductivity is 61 per cent IACS (International Annealed Copper Standard).

CHECKS SCREW STRIPPING— A new thread cutting screw developed by the Shakeproof Div. of Illinois Tool Works, Elgin, Ill., is said to give twice the stripping torque of comparable screws. Called "Nibscrew," it's recommended for uses that have little screw-thread engagement.

BOON FOR SHIPPING— A pneumatic dunnage cushion is speeding the loading and unloading of boxcars and eliminating cargo damage. Developed by United States Rubber Co., New York, the inflatable bag is made of nylon coated on each side with Neoprene. Placed in the voids between cargo, the inflated cushions absorb impact and keep cargo from shifting. Bracing and shoring lumber aren't needed.

Metalworking Outlook—Page 53 Market Outlook—Page 127

Checklist for Atomic Welders

Production

1. Machine all stainless steel joints. (Don't use flame cutting.)
2. Pay attention to good fitup.
3. Clean all joints well. Abrade with a stainless steel wire brush, wash with new acetone, rinse with clean water, dry with lint-free wipers.
4. Keep base metal between 0 and 300° F before welding.
5. Metallic arc and metal inert gas welding require direct current, reverse polarity; use straight polarity for tungsten arc. (Use only thoriated tunepten.)
6. Be sure to make the first two passes with argon or helium protection on the underside.
7. Don't use nonremovable backup rings.
8. Inspect root, mid, and completion passes with dye penetrant.

Quality

1. Are raw materials (castings, plates, welding rods) of ultrasonic and radiographic quality? Do you know their chemistry?
2. Is internal finish smooth, free from pinholes and subsurface pockets?
3. Do welds have full penetration, x-ray quality, and strength?
4. Have weldments been inspected for zero leakage before and after hydrostatic testing? (Use helium mass spectrometer.)
5. Have your welders passed qualification tests?
6. Before shipment, have all openings been sealed? Is the weldment pressurized with an inert gas or sealed in an evacuated container?

Atomic Reactors Get Top-Grade Welds

Powerplants couldn't be made without them. Requirements exceed those of ASME unfired pressure vessel code. Here's how they're met by two component makers

THE checklist above is dramatic evidence of the high standards required for atomic reactor welding.

It summarizes the rules F. R. Drahos of the Byron Jackson Div., Borg-Warner Corp., Los Angeles, gives to welders at his firm.

Here are some of the practices followed to insure top quality welds in reactor pumps.

Requirements — Parts used for radioactive installations can't leak. Full penetration, smoothness on the fluid side, and x-ray quality are musts for welds.

You can get such joints with proper preparation. The most satisfactory root passes, say Byron Jackson engineers, have been obtained with a beveled open joint and filler metal, or a consumable insert.

Example — Centrifugal pumps for reactors must operate without leakage in 600 to 1100° F liquids at pressures up to 200 psi. The housings or cans for almost all pumps being made are stainless or Inconel 0.020 to 0.050 in. thick.

The key portions of such pumps are the cans which surround the stator and rotor. They keep radioactive liquids away from windings.

Pumps like that are used on the *Nautilus*. Before being put into service, they are tested hydrostatically at 3750 psi, followed by a helium mass spectrometer testing with 2000 psi on the liner cavity.

Byron Jackson welds its reactor pumps with a tungsten arc, shielded with argon. Electrode geometry, arc angle, starting and stopping of the arc, and speed of travel are extremely critical.

The company's engineers like argon for backing up the lower sides of welds. They find that helium has some advantages, but it sometimes leaves irregular surfaces and marked depressions in the inner centers of welds.

Operator is about to weld a second pass. Note that circumference is marked into segments. Welds are made 6 in. at a time to avoid cumulative distortion

Here is a cross section of the welded joint (above) used at Reliance Electric to join flange to motor shell on atomic reactor pumps

Here's Another Approach . . .

RELIANCE Electric & Engineering Co., Cleveland, is a major producer of atomic pumps. Wayne H. Gunselman, manufacturing engineer, points out that temperature buildup forced his departure from conventional welding practice.

The customer asked that the original pump design be reduced 25 per cent in weight and size. That called for a radial type shrinkage weld. Everything tends to pull in and distort such welds. They require special techniques for compensation to reduce hot cracking.

Once the metal was selected (Type 304), Reliance could determine the kind of rod needed. It found that a straight, lime-coated Type 308 rod did the job satisfactorily.

The weld starts with the U-joint above, right. The small lip at the bottom is perfect for a smooth root pass. It eliminates the need for a consumable insert.

Temperature of the base metal is watched closely to avoid carbide precipitation. The welder completes only 6 in. of weld at a time. He removes the slag and cold works it (if necessary) before moving to the opposite side of the can.

Cold Working—The main weld joins the flange to the can and resembles a cylinder being joined to a ring. Reliance uses conformity gages to check the amount of heat distortion—it's kept within 1/16 in. (1/32 in. on each side). When distortion exceeds those limits, the welds are given a controlled amount of cold working.

This eliminates cracking caused by the tendency of the weld deposit to shrink or pull in. It minimizes distortion and reduces the amount of residual stress.

Objections Answered—The big concern of most outsiders, says Mr. Gunselman, is the degree of cold working. Since the bead is mechanically worked immediately after it is deposited, there is some residual heat. In addition, the welder doesn't try to move a great deal of metal at once. Finally, the subsequent bead or deposit remelts the surface and transfers enough heat to anneal the previous bead.

Proof — Welds are frequently checked with a Tukon hardness tester. It substantiates theory: Residual cold work is practically nonexistent, and it eliminates tiny stress cracks.

Here is Reliance's procedure:

- Lay root pass, 6 in. at a time (coated stick electrode).
- Chip slag, grind, check with dye penetrant.
- Lay successive passes, 6 in. at a time.
- When required, cold work immediately after welding.
- Check each ½-in. layer with dye penetrant.

Quality — Mr. Gunselman also points out that they don't try to inspect quality into the product. The persons selected are conscious of quality, proud of their work. They bend over backward to keep up the quality of their welds.

Dye penetrants, x-ray and several inspection techniques are only operator aids. They tell him whether his technique is varying from day to day.

Qualifications — All Reliance welders must pass the AEC standard welder qualification. They are also checked out by the customer.

Large shaft for a roll forging machine is contour turned at National Machinery Co., Tiffin, Ohio. Tolerances on this heat treated forging are held to ±0.001 in.

Tips on Turning Heat Treated Steels

Similar characteristics of hardened steels make it possible to generalize on machining speeds and feeds. Here, also, are guideposts to tool selection and design

HOW FAST can you machine heat treated steels? What tool materials should you use? What tool shapes are recommended?

Here are some suggestions. They're based on metal cutting research projects and application studies done by A. B. Albrecht, research engineer, at Monarch Machine Tool Co., Sidney, Ohio.

The Base—The primary function of alloying elements in steels is to improve their hardenability so a uniform microstructure and hardness are obtained on quenching. Some hardening elements, such as nickel and manganese, also strengthen the ferrite matrix of tempered steels and make them more difficult to machine than other steels of similar hardness. But when steels of like carbon content are quenched and tempered to the same structure and hardness, they generally have similar physical properties.

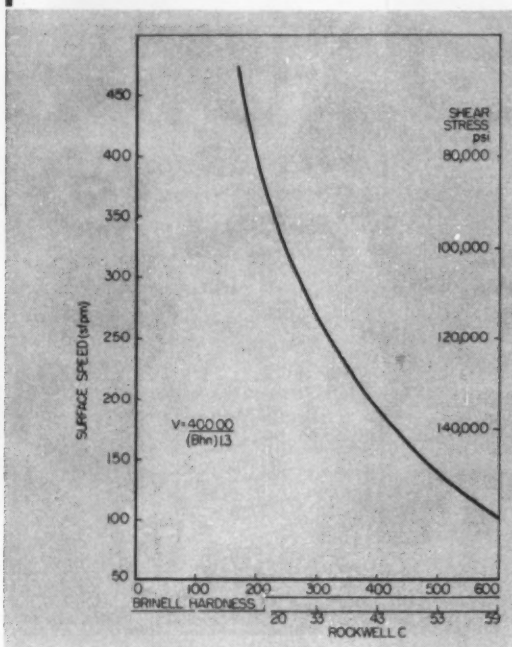
It means that through-hardened steels of like hardness will show similar machining characteristics. Cutting speeds and feeds which apply to all quenched and tempered steels may be established.

Hardness vs. Speeds—In many cases, heat treated parts can be turned at fairly high surface speeds. Alloy steels at 240 to 320 Brinell have excellent machinability. They have a uniform structure with sufficient ferrite to make them easy to cut.

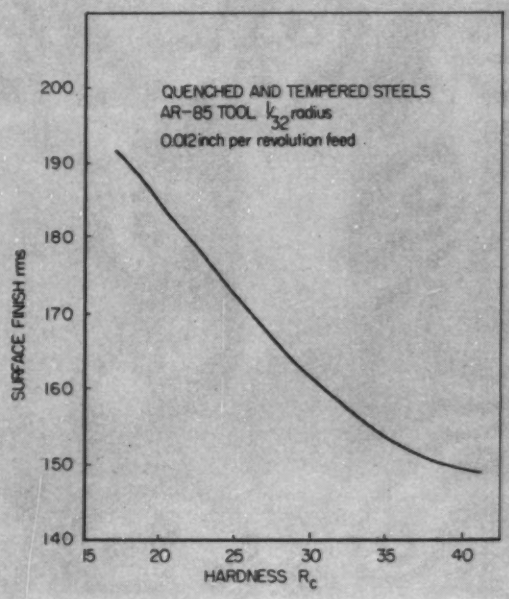
Above 42 Rockwell C, machining gets increasingly tougher because the metals get less ductile. The thin chip produced shows little evidence of deformation during shear. A fracture type comes off, and that leads to chatter. Feed loads increase, and tool breakage becomes a problem.

Oxide tools have made it possible

Speed vs. Hardness



Surface Finish vs. Hardness



to turn high hardness materials which were machinable only by grinding. Progress in this area has been slow; the oxide tools don't have sufficient edge strength to take deep cuts, and the high tool pressures developed in the high hardness range lead to work distortion and inability to hold size. In the lower range, Rc 26 to 36, good results have been obtained with hard carbides and oxide tools. Good finish and close tolerances may be held, and grinding is often eliminated.

Tooling—Negative rakes can be used to turn steels with a hardness of Rc 26 to 32. Above that range the standard BR tool with a zero-degree back rake and six-degree side rake is normally used.

Tool breakage is the big problem. Select the carbide grade carefully. Use C-7 grades for roughing and C-8 grades for finishing. On heavy duty work, C-5 grades can be used. When you can, keep chip loads light and stay with the harder carbides.

Feeds—Heavy feed rates in the higher hardness range result in increased shear value. Up to Rc 28, feeds of 0.028 to 0.032 in. per revolution are practical on heavy parts. From Rc 30 to 36 and above, a minimum feed of 0.018 ipr is recommended. Above Rc 42, shear values increase only slightly, but the abrasive properties of the steel become an important factor.

The yield-tensile ratio is important in machining. A ratio of 0.88:1 or more leads to machining trouble. The radial pressure on the tool is high and the nose of the carbide tool is likely to break.

Finish—You can expect surface finish to get better as the hardness of the workpiece material goes up. It will, at least to hardnesses of about Rc 42. Beyond that point, increases in hardness have little effect on the resulting finish.

Speed and Feed Chart for Heat Treated Steels

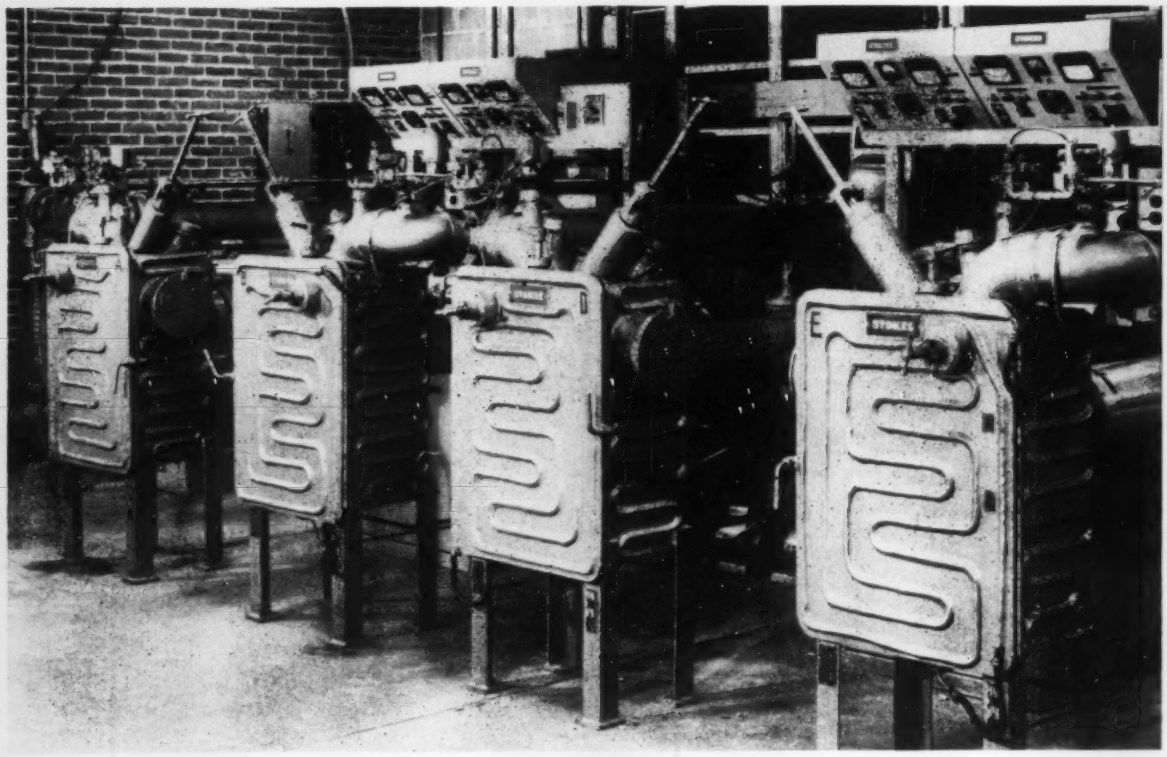
ROUGHING

Hardness	Speed Range (surface feet per minute)	Feed Range (in. per revolution)	Depth of Cut* (inches)
Rc-26	280-330	0.013-0.028	0.375
32	250-275	0.011-0.022	0.250
36	210-240	0.011-0.018	0.187
42	175-200	0.007-0.013	0.093

FINISHING

Hardness	Speed Range (surface feet per minute)	Feed Range (in. per revolution)	Depth of Cut* (inches)
Rc-26	340-400	0.0035-0.013	0.093
32	300-350	0.0035-0.011	0.062
36	250-280	0.0035-0.009	0.032
42	210-240	0.0035-0.009	0.032

*Maximum depth.



Small vacuum furnaces offer close chemical control and short cycles

Investment Caster Uses Vacuum

At Austenal Inc., Dover, N. J., vacuum casting of investment molds is a production line operation. Main application is in the casting of nickel-base alloys for gas turbine blades

THE BEST WAY to make large quantities of vacuum cast parts is to use small furnaces, believes Microcast Div., Austenal Inc., Dover, N. J. Its reasons:

1. Chemical analysis can be controlled more closely.
2. Individual molds can be processed quicker.
3. Low vacuums are possible without excessively large pumping systems.
4. Leak detection and monitoring requirements are not excessive.
5. Special processing techniques can be used.

Readymade—The exacting properties and quality required in production vacuum casting are best achieved by using large heats of master alloy which are previously vacuum melted, says P. W. Beamer. (Formerly manager of metallurgical research for Microcast, he's now manager of product development, Metals Div., Kelsey-Hayes Co., Utica, N. Y.)

The necessary testing and analytical work can be done before the master heats are used. Small portions of the master heats are remelted and cast into individual molds.

Analyses of 30 heats remelted from a number of master heats of Udimet 500 showed variations in chemical composition no greater than the analytical error of the laboratory.

Greater percentages of elements such as cerium, lanthanum, boron, columbium, tantalum, and zirconium are retained in vacuum melted alloys than in air melted alloys.

The small furnace method used at Austenal eliminates alloying and refining time required for virgin 300 to 400 lb heats.

Melting Details—The small furnaces are usually scaled-down versions of larger units. Their pumping systems are capable of maintaining pressure below 10 microns during melting, with cold leak rates of less than 16 microns an hour.

Casting takes place 25 to 40 minutes from the beginning of melting.

Temperatures for producing turbine blades and vanes are critical. An immersion thermocouple is used. It can be removed without breaking the vacuum on the melting unit.

Radiation pyrometers also can be used, but optical instruments have limited application for close control of metal temperatures in small furnaces because of vapor deposition on sighting glasses and unstable conditions inside the vacuum tank.

Metals—Each group of alloys reacts differently to the vacuum process. So far, only a few alloy systems have been investigated. Process evaluation has been conducted only on those alloys for which vacuum processing is believed to be necessary.

The alloy systems used most in the high temperature field have a nickel base and are strengthened or hardened with aluminum and titanium. When melted and processed under normal atmospheres, the alloys are seriously affected by surface and internal inclusions. A dross type slag is prevalent throughout the melt because of excessive oxidation of the aluminum and titanium.

The success of vacuum melted Waspaloy and Udimet 500 as wrought material is responsible for their selection for vacuum investment castings. Similar nickel base alloys (GMR-235, Inco 713, Guy Alloy, and M-252) and iron base alloys (A-286, Discaloy, and M-308) also are cast in a vacuum.

Melting Cycle — The alloy, the part to be cast, and special requirements (such as grain size control) will affect the melting cycle. In a typical cycle:

1. Metal from a master heat of previously vacuum melted alloy is charged into the crucible. (Alloy additions and deoxidizers are not needed.)

2. The hot investment mold is placed in the vacuum chamber. Heat losses in the mold cavity during a normal melting cycle are 200 to 250° F. Superheating can compensate for the heat loss.

3. The entire vacuum chamber is evacuated. When a pressure of about 5 microns is reached, power is applied and melting begins. The vacuum pumps maintain pressures below 10 microns throughout the melting and casting cycle. Pressures are usually as low as 2 to 4 microns.

4. The quality of processing is checked by taking a gas evolution rate. It equals the total pressure rise in the vacuum tank while the tank is isolated from the pumping system and includes the leak rate of the vacuum system.

The evolution rate gives a relative estimate of the total gas conditions in the vacuum tank, including gases removed from the metal and those resulting from a low pressure reaction between the molten alloy and the melting crucible.

5. When metal reaches the casting temperature, a final temperature check is made, and the metal is cast into the mold cavity. Mold permeability is not as important as in conventional air molding because back pressure is not created in the mold during casting.

6. The mold is allowed to cool under vacuum to a temperature below which any surface oxidation or intergranular attack may occur.

7. The chamber is pressurized

FIG. 1

Stress Rupture Properties of Vacuum Investment Cast Alloys

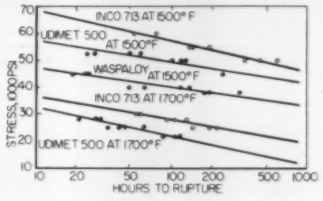


FIG. 5

Stress Rupture Strengths 100-Hour Life

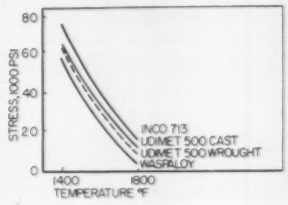


FIG. 2

Elongations and Reductions of Area

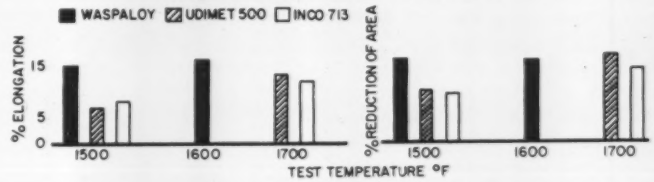


FIG. 3

Tensile Strengths

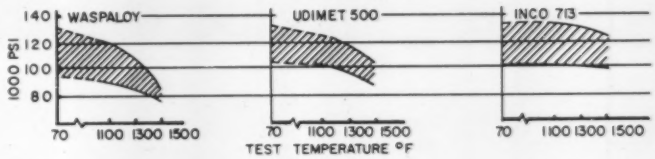
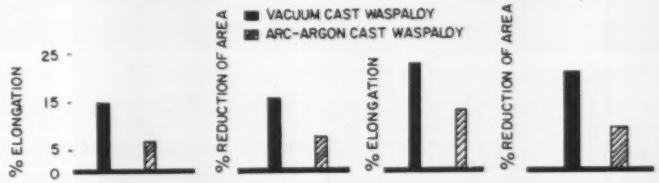


FIG. 4

Stress Rupture Tests At 1500° F

Tensile Tests At Room Temperature



INVESTMENT CASTER . . .

with air, the tank is opened, and the mold removed.

Mechanical Properties—A series of alloy evaluations was made to determine the effects of vacuum processing, casting conditions, and alloy compositions on stress rupture properties; tensile and yield strengths; and elongations and reductions of area.

Test specimens were cast to size and not machined before testing. Results represent reliable average properties—not maximum or minimum values.

Fig. 1 shows how vacuum melted alloys exceed Aeronautical Materials Specification 5382—a rupture life of 15 hours and a stress of 30,000 psi when the temperature is 1500° F. Waspaloy with its lower aluminum content begins to lose strength rapidly at 1600° F.

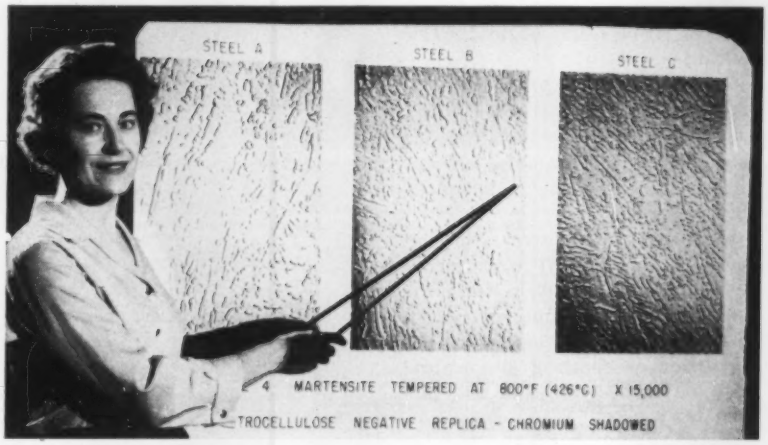
All the alloys have good ductility. Waspaloy (see Fig. 2) has the highest elongation and reduction of area. GMR-235 and Guy Alloy show similar improvement when vacuum cast.

Tensile data for vacuum investment cast specimens are shown in Fig. 3. Although the elevated temperature tensile properties of cast Waspaloy and Udimet 500 are not equivalent to wrought tensile properties, they are substantially higher than those obtained with production cobalt base alloys.

The improvement in room temperature ductility is important. All these alloys show good elongation; the values are normally well above 5 per cent.

Comparison—A heat of Waspaloy, previously vacuum melted, was cast from an indirect arc furnace under inert atmosphere (argon). Rupture properties at 1500° F, especially at short times, were comparable to those of vacuum cast Waspaloy. (Fig. 1) The elongation and reduction of area comparisons in Fig. 4 are more indicative of the improvement in properties obtained by vacuum melting.

The 100-hour rupture properties are presented in Fig. 5. Note that cast Udimet has better rupture life than the wrought material at elevated temperatures. Similar improvements for Waspaloy have been observed.



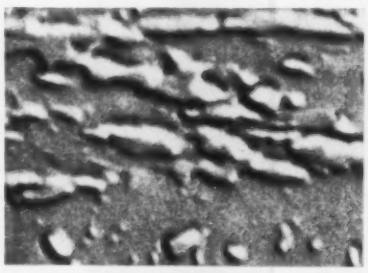
Miss Anne Turkalo, metallurgist at the General Electric Research Laboratory, explains technique for measuring the strength of steel by taking pictures of the metal surface with the electron microscope

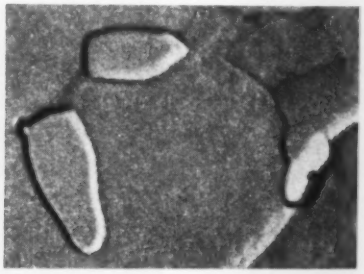
Clue to Stronger Steel

FUNDAMENTAL research on the microstructure of materials at the General Electric Research Laboratory, Schenectady, N. Y., has shown that the strength of steel is directly related to the average distance between the tiny particles of carbide (see photos above).

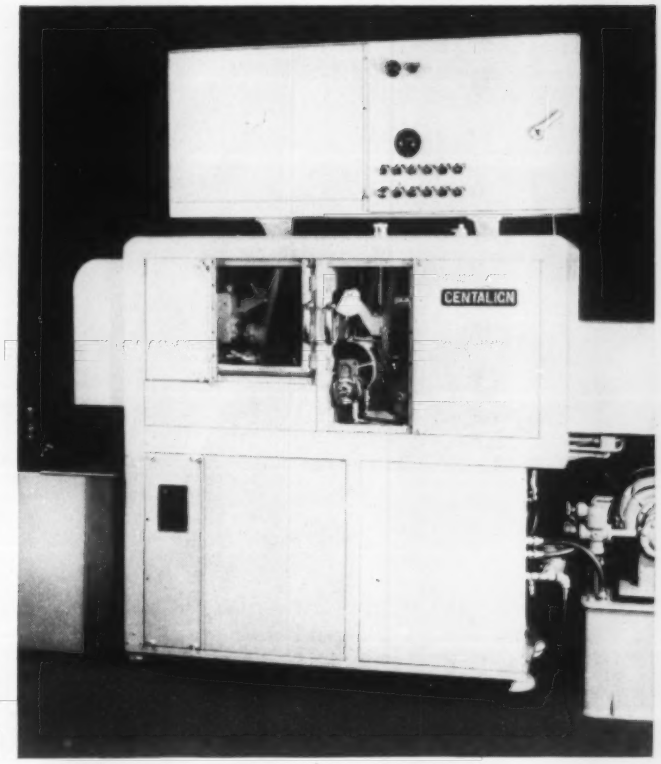
GE researchers, Miss Anne Turkalo and Dr. John R. Low Jr., told a meeting of the AIME at the 2nd World Metallurgical Congress in Chicago that they can measure the strength of steel by taking a picture of its surface with an electron microscope. Some of the tiny bumps shown in the photographs are only a millionth of an inch in diameter.

Different tempering techniques produce different size particles and different spacing, which give differences in strength. Only by understanding the basic microstructure of metals on a fantastically small scale will it be possible to design the superstrong materials needed for future planes, rockets, and missiles, say General Electric metallurgists.





The photograph at left, magnified 40,000 times, is a piece of steel two and one half times as strong as the steel (right) with the big lumps—some are thirty thousandths of an inch in diameter



Bryant "Centalign" internal grinder for finishing tapered bearing races. Built for lower cost with welded steel.

LESS WEIGHT... GREATER CAPACITY

Costs cut with welded steel

By taking full advantage of the superior strength and rigidity of steel, engineers of the Bryant Chucking Grinder Company have reduced the cost of this machine base.

Other significant benefits are:

- **Reduced Weight**—26% less.
- **Increased Capacity**—swing of machine increased from 9 to 12 inches.
- **Closer Tolerances**—average size variations from piece to piece on bearing races lowered from 0.00040 to 0.00015 inches and surface finish improved from 21 to 10 micro-inches rms.

These advantages are typical of those being realized by machine tool manufacturers who have designed their product for welded steel. You can attain similar benefits. The Lincoln Electric Company stands ready to assist with your redesign projects.

DESIGN HELPS for engineers and designers

"Procedure Handbook of Arc Welding Design and Practice" new 11th edition, 1300 pages, over 1100 illustrations. Has 240 page section on Machine Design. Price only $3.00 postpaid in U.S.A. $3.50 elsewhere.

Machine Design Seminars conducted regularly at our plant in Cleveland.

Machine Design Sheets sent free to designers and management.

Write to us for full details.

LINCOLN

THE LINCOLN ELECTRIC COMPANY

Dept. 1634, Cleveland 17, Ohio

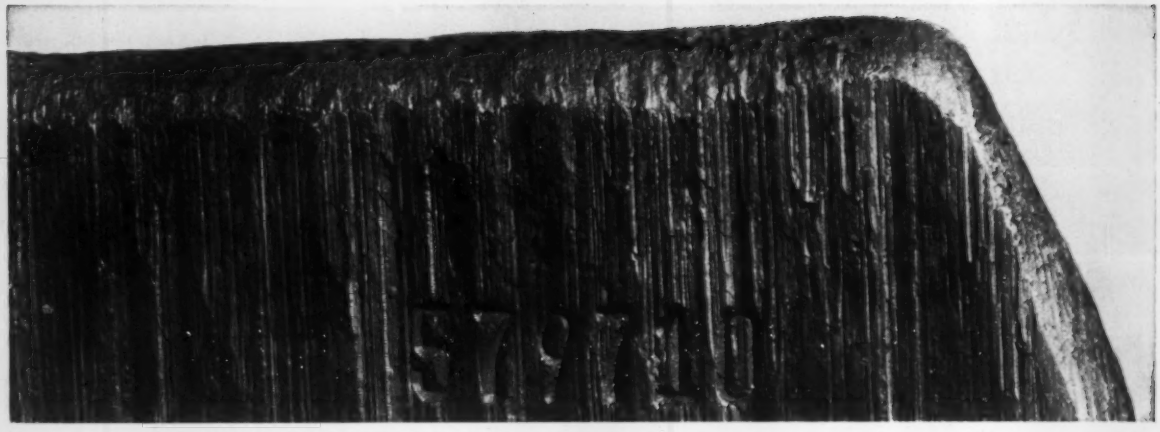
The World's Largest Manufacturer of Arc Welding Equipment

When welded steel is three times stronger than iron

Has 2½ times the rigidity

Yet costs ⅓ as much per pound

WHY use anything but welded steel for machine bases?



Deep, clear markings (like these on the end of a bloom) are not obscured by shear markings, or by scaling in a reheating furnace. The latest marker can stamp 18 characters at one crack

Automatic Marking Gains Favor

Republic Steel joins the parade of companies adopting remotely controlled marking for semifinished steel. The 90-in. slabbing mill will have an 18-digit marker

REMOTE CONTROL marking will add the finishing touch to the new 90-in. slabbing mill at Republic Steel Corp., Cleveland. When it begins rolling this fall, an operator sitting in a pulpit will push buttons to mark each slab with ingot number, heat number, and cut designation.

Although called a 90 incher, the mill is intended to roll slabs 28 to 76 in. wide. Rated at 300 tons an hour, it will undoubtedly exceed that figure by a good margin. The big slabs it will turn out are expected to increase the production of Republic's hot strip mill from 160,000 to 203,000 tons a month.

The mill is a universal type. Housed in a bay 85 ft wide (the motorroom is is only 40 ft wide), it is next to an older 44-in. slabbing mill. The narrow space available made it necessary to design unusually short motors and drives.

Republic's Marker—The machine is the latest in a family of such facilities made by M. E. Cunningham Co., Pittsburgh. They keep getting bigger and more automatic. The Republic slab marker will be able to stamp up to 18 characters (which Cunningham says is a record). The heavy markings bite through scale and surface roughness to assure positive identification from the time the slab is sheared until it enters the hot strip mill.

The characters are carried on a series of wheels set into a heavy marking head. Air valves actuate the marking wheels, while a series of solenoid-operated indicator wheels in the pulpit shows the operator how the marking wheels are set.

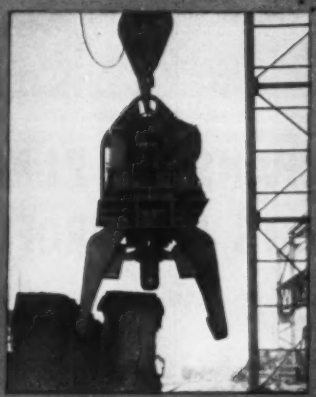
The marker will be between the upcut shear and the pilers. The full unit consists of a heavy carriage to which the marking head is linked by pivoted parallel arms. An air cylinder propels the marking head against the slab.

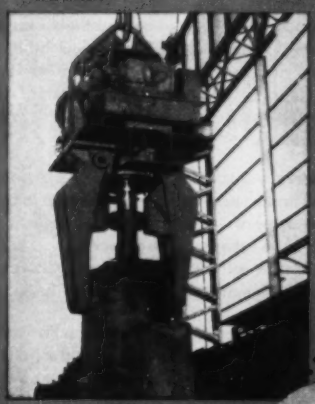
Has Speed, Accuracy—F. S. Speicher Jr., Cunningham's president, says that this equipment eliminates a bottleneck in the production of semifinished steel. "With the trend to card-operated mills and faster operations, marking of heat number, ingot number, thickness, width, and length on semifinished steel poses problems," he points out. "Valuable time can be wasted by hand setting marking equipment. Some mills have three men presetting markers to keep up with production. Remote controlled marking requires only one man."

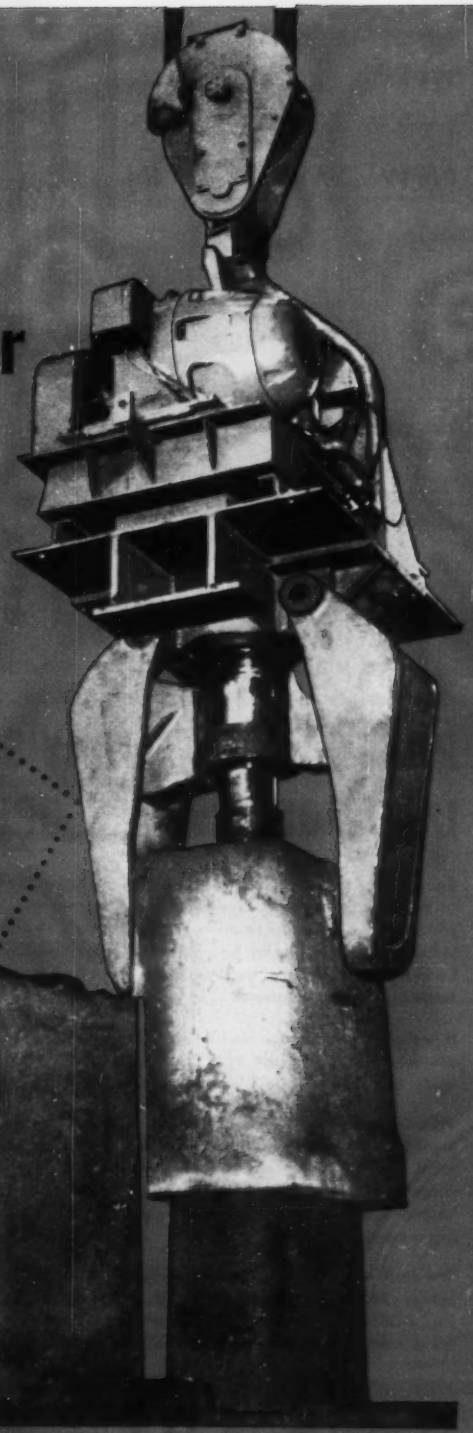
A second advantage claimed is greater accuracy. The operator can see at a glance how his marker is set.

Bethlehem Has One—A marker similar to Republic's (though it has fewer characters) is used on a 40-in. mill in one of the Bethlehem Steel Co. plants. It stamps heat number and letter on the end of each slab, so it can be moved off the roller line and into the piler without delay. The job would be hazardous, if not impossible, to do by hand. Having all the markings on the end of the slab aids inspection and makes it easier for the recorder and shipper to keep good records, say Bethlehem engineers.

450 TON
portable ingot stripper
in action







Our newly designed 450 ton Portable Ingot Stripper may be used every day of the year or on a stand-by basis.

Write today for our illustrated brochure and complete information.

"Electric and Open Hearth Steel Castings from 1 lb. to 100 tons"

Pittsburgh
ENGINEERING & MACHINE CO.
Division of Pittsburgh Steel Foundry Corporation

P. O. BOX 986,
PITTSBURGH 30, PENNSYLVANIA
PLANT AT
GLASSPORT, PENNSYLVANIA

PROJECTING TODAY'S PLANT EXPANSION PLANS INTO TOMORROW'S OPERATING COSTS AND PROFITS

Ben Franklin once cautioned a business acquaintance: "Beware of little expenses; a small leak will sink a great ship." No philosophy is more apropos in guiding today's expanding industrialist. The greatest pitfalls in industrial development lie in hidden costs . . . "little expenses" that can undermine tomorrow's profit structure.

In weighing factors involved in an industrial move, a plant site-selection team must avail itself of expert advice and study all relevant data.

Philadelphia's Department of Commerce, Industrial Development Division, now has available a qualified staff to supplement the site-selection team of any industry desiring to investigate opportunities in this City, fourth largest in the United States, and hub of a 100-mile radius market boasting a population of 22,500,000.

The staff applies what it terms the "AAC Formula" to each survey. ANALYSIS of each factor for its relative importance . . . ADDITION of all factors, favorable and unfavorable, for a composite picture . . . COMPARISON with the industry's other site surveys to bring to light possible hidden costs and superficial advantages.

Hidden costs are prevalent in four areas: (1) lack of adequate police and fire protection, the latter resulting in high insurance premiums; (2) lack of adequate water supply and sewage disposal systems, substantially increasing maintenance costs; (3) non-proximity to consumer and raw materials markets and inadequate transportation facilities, creating costly shipping and receiving problems, and (4) lack of qualified personnel, causing additional recruiting and training expenses.

The most deceptive superficial advantages are low land acquisition costs and substantial tax concessions. Both "advantages" disappear when population increases necessitate new schools and other municipal services . . . both may penalize and alienate established industry in the area . . . both rarely offset high maintenance costs.

Utilize Philadelphia's site-selection staff . . . the service is cost-free . . . all inquiries are processed confidentially. Take a close look at industrial land being readied at both city-owned airports . . . sites offering strategic advantages in a stable community where industry can project plans with reasonable accuracy.

Philadelphia DEPARTMENT OF COMMERCE

INDUSTRIAL DEVELOPMENT DIVISION • City Hall, Philadelphia 7, Pa. • FREDRIC R. MANN, Director of Commerce

Acid Treatments for Removing Scale on Stainless

Treatment A

1. Immerse for 10 to 45 minutes in an 8 to 11 per cent (by volume) 66°Be inhibited sulphuric acid solution maintained at 160 to 180°F.

2. Remove and rinse with water under pressure or agitate in water bath.

Treatment B

Add 5 to 6 per cent of sodium chloride (by weight) to bath in Treatment A. Treat parts for 10 to 45 minutes.

Treatment C

Add 5 per cent of ferric sulfate (by weight) to bath in Treatment A. Treat parts for 15 to 20 minutes. (This treatment is used for chromium-nickel grades only. It is called the Ferrisul process, and is owned by Monsanto Chemical Co., Boston.)

Treatment D

1. Immerse in a 10 to 15 per cent (by volume) 20°Be, inhibited (a) hydrochloric (muriatic) acid solution at 120 to 140°F. Treatment time varies from 30 to 90 minutes, depending on grade and condition of scale.
2. Remove and rinse with water under pressure or agitate in water bath.

Treatment E

1. Immerse for 5 to 7 minutes in an 8 to 11 per cent (by volume) 66°Be inhibited (a) sulfuric acid solution maintained at 160 to 180°F.

2. Remove and rinse in water.

3. Transfer to an 8 to 12 per cent (by weight) sodium hydroxide solution containing 2 to 4 per cent (by weight) potassium permanganate. Temperature is 160 to 180°F. Allow work to remain for 15 to 90 minutes.

4. Remove and rinse in water.

5. Repeat operation No. 1 for 3 to 5 minutes.

6. Remove and rinse in water.

Treatment F

1. Immerse in molten sodium hydroxide containing an oxidizing salt.

2. Quench in water.

3. Immerse for 3 to 4 minutes in 8 to 11 per cent (by volume) 66°Be inhibited (a) sulfuric acid at 160 to 180°F.

4. Remove and rinse in water. (This process is patented by Hooker Electrochemical Co., Niagara Falls, N. Y.)

Treatment G

1. Immerse for 10 to 15 minutes in molten sodium hydroxide containing 1.5 to 2 per cent of sodium hydride (by weight) at 750 to 800°F.

2. Quench in water.

3. Immerse for 1 to 2 minutes in an 8 to 11 per cent (by volume) 66°Be inhibited (a) sulfuric acid bath at 160 to 180°F.

4. Remove and rinse in water. (This process is patented by E. I. du Pont de Nemours & Co. Inc., Wilmington, Del.)

Note: (a) Consult acid suppliers for list of inhibitors. Use as recommended by manufacturer.
Note: The molten alkalies used in Treatments F and G soften and alter the composition of the scale. Water quenching from the high operating temperature of the bath effectively loosens the most tenacious scale.

Pickling Stainless to Remove Scale

Nature of scale can vary greatly. There is no one descaling method for all situations; it must be selected for the job. Seven pickling treatments are listed

By W. E. McFEE
Supervisor
Product Information Service
Armco Steel Corp.
Middletown, Ohio

SCALE formed on stainless steels by exposure to high temperatures and furnace gases or from welding impairs corrosion resistance unless it is properly removed. It also can be a hazard in fabricating.

Scale adheres tightly to stainless; it is more difficult to remove than that on carbon steel. Two basic methods of removal are used: Mechanical (sandblasting and tumbling) and chemical (pickling in acid solutions).

Shotblasting — When stainless parts are cleaned by shotblasting, they also should be chemically cleaned in a nitric-hydrofluoric acid solution. Do not shotblast stainless parts with hardened steel grit unless the blasted surface is completely removed by grinding or machining and finally cleaned with a nitric-hydrofluoric acid solution.

Nature of scale can vary greatly. It is affected by composition of the alloy, temperature and time of exposure and furnace atmosphere. The descaling method should be selected for the job. There is no one method for all situations. Usually, two main steps are necessary: 1. Scale removal. 2. Final scale removal and whitening.

Tumbling—When scale is heavy and the parts permit, it is useful to tumble before scale removal. It eliminates much of the brittle top scale and cracks the layers

underneath. This makes more uniform removal in the pickling operation possible.

Oil quenched parts should be cleaned before pickling to prevent oil films from forming on the solution. Skimmers or a weir may be used to keep the tank clean.

Treatments — A heated sulfuric acid solution (treatment A) is the conventional step in scale removal. It works well on light or moderately heavy scale.

The acid undermines and dissolves the scale. Hydrogen gas that is liberated during the reaction with the base metal helps lift off the scale.

Metal Loss — Keep pickling times as short as possible when using sulfuric acid. Metal loss increases with the time the steel is in the bath.

Alkaline solutions and molten caustics shorten pickling time and reduce metal loss. They attack scale, not metal. Where scale is stubborn, include an alkaline oxidizing treatment (see treatment F). Use of a molten caustic, as in treatments F and G, also is recommended.

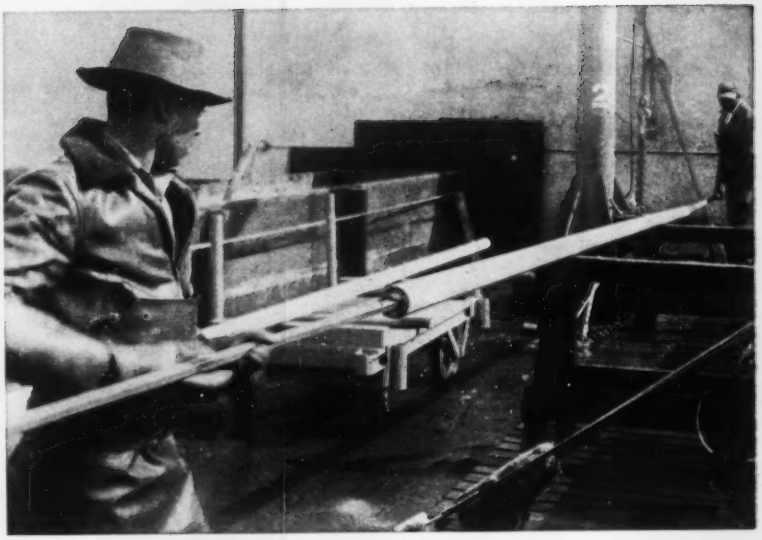
Scale treating solutions containing chlorides create a hazard. Guard against pitting by the ferric chloride that is formed (see treatments B and D).

Whitening—Final scale removal and whitening are done in a solution containing 6 to 15 per cent nitric acid by volume and 0.5 to 1.5 per cent hydrofluoric acid by volume. Follow with a water rinse. For chromium-nickel grades, maintain the bath temperature between 110 and 140°F. Higher temperatures cause dangerous fuming.

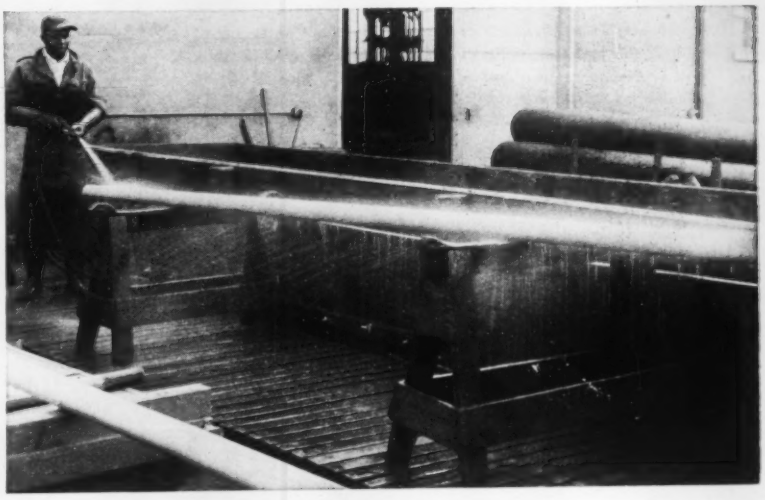
Time for the operation varies from 2 to 30 minutes. Hydrofluoric acid content increases the whitening effect of the nitric acid. Operating requirements and cost of acid will determine the most economical solutions and treatment times. A weaker acid solution produces the same result as a stronger solution, but exposure will be longer.

Weld Scale—Light scales, such as developed in resistance welding, usually can be removed by the nitric-hydrofluoric treatment alone. This is followed by the usual water rinse.

If any scale remains, remove it by hand or mechanical brushing. Then rinse thoroughly in hot water to prevent residual acid from staining the metal. Complicated parts should be neutralized in a suitable alkaline bath followed by a hot water rinse.



Swabbing inside surfaces of stainless pipe with nitric-hydrofluoric acid solution



A clear water rinse follows the pickling operation

Hardenable Types—Do not pickle the high carbon stainless grades in the fully hardened condition. Stress relieve after hardening and before pickling.

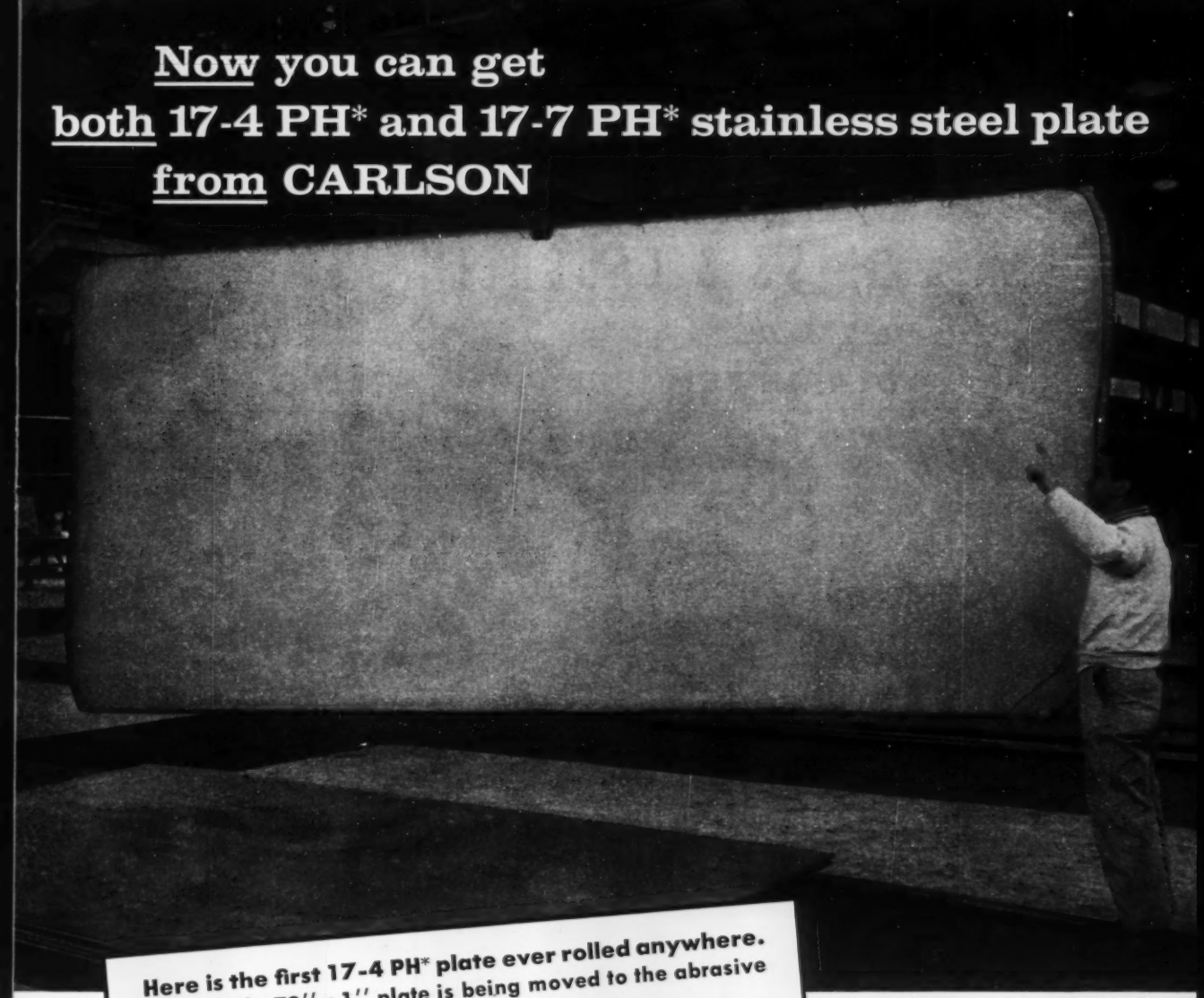
When hardenable grades in the fully annealed condition are pickled, they are attacked by the nitric-hydrofluoric acids. The surface may be roughened by exposure to these acids.

Embrittlement — Hydrogen embrittlement from exposure to reducing acids generally is not a problem with most stainless steels. The austenitic chromium-nickel and ferritic chromium steels apparently are not susceptible.

Hardenable stainless steels when fully hard sometimes may be embrittled. The high carbon grade 17-C-100 also is sensitive in the annealed condition. After pickling, bake at 200 to 600°F in steam or air to prevent embrittlement.

Iron Pickup—During cold working, there always is the possibility

Now you can get both 17-4 PH* and 17-7 PH* stainless steel plate from CARLSON



Here is the first 17-4 PH* plate ever rolled anywhere. This 179" x 79" x 1" plate is being moved to the abrasive cutters for trimming to specified size.

You can build equipment with either of two precipitation-hardening stainless plate grades—17-4 PH* and 17-7 PH*. Both are available at Carlson—both can be cut to your exact specifications to save delays and true-up time in your own plant.

The Armco-developed 17-4 PH and 17-7 PH grades combine ease of fabrication, hardenability, high strength and corrosion resistance. These grades have the desirable mechanical properties of the hardenable chromium types and a workability and corrosion resistance approaching regular 18-8 stainless steels. Simplified low temperature heat treatments will produce a Rockwell hardness of C40 to C50. And tensile strengths range from 180,000 to 215,000 psi depending upon the heat treatment.

Take full advantage of our complete service in stainless steel plate and plate products. Write, wire or phone for detailed information on 17-4 PH and 17-7 PH stainless steels.

*Trade Mark of the ARMCO STEEL CORPORATION

G.O.CARLSON Inc.

Stainless Steels Exclusively

THORNDALE, PENNSYLVANIA

District Sales Offices in Principal Cities

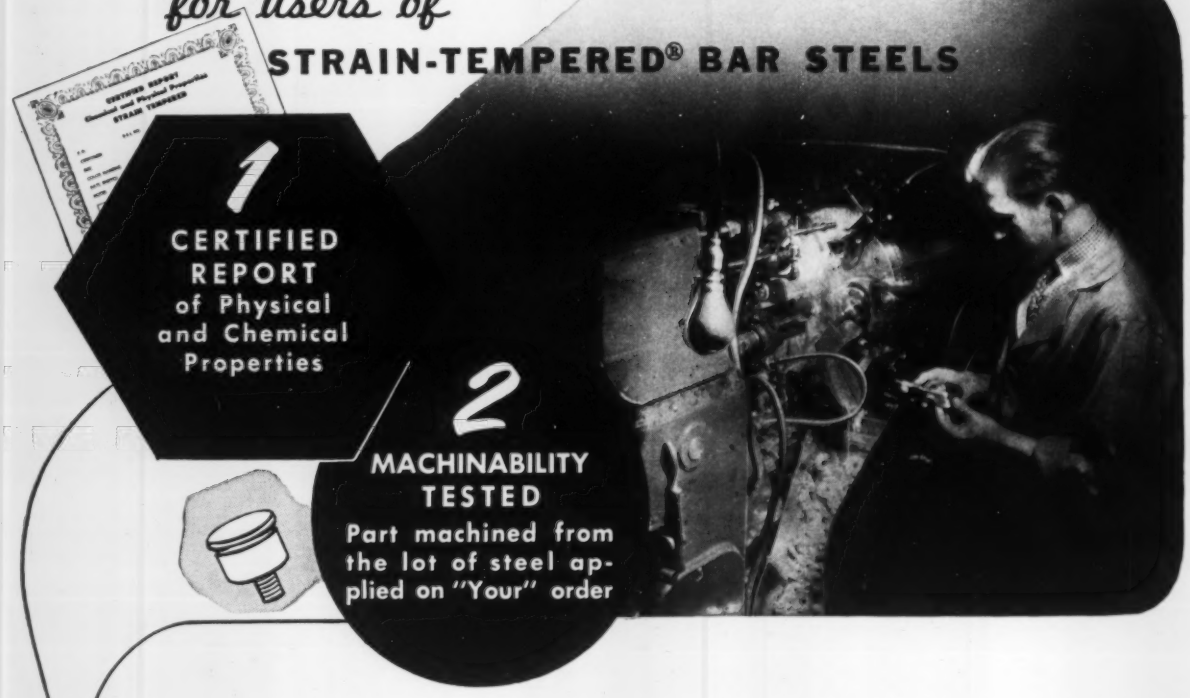
PLATES • PLATE PRODUCTS • HEADS • RINGS • CIRCLES • FLANGES • FORGINGS • BARS and SHEETS (No. 1 Finish)

New STEEL SERVICE

by BLISS & LAUGHLIN, INC.

for users of

STRAIN-TEMPERED® BAR STEELS



1 CERTIFIED REPORT of Physical and Chemical Properties

2 MACHINABILITY TESTED

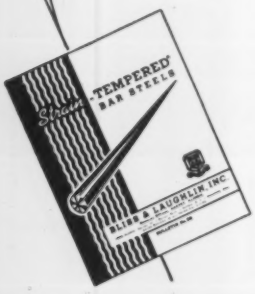
Part machined from the lot of steel applied on "Your" order

Now Bliss & Laughlin gives you extra value in Strain-Tempered Bar Steels . . . thus enabling you to improve production and reduce fabricating costs.

Every shipment of Strain-Tempered C-1144 Steel which you receive is attested by a certified report of the chemical composition and physical properties of the steel . . . plus a sample part made from your order subjected to our standard machinability test at the feeds and speeds recommended on B. & L.'s Machinability chart.

This is your assurance of *uniform quality steel* . . . pre-conditioned to your job by controlled furnace treatments . . . and pre-tested by normal machining operations.

You save on (1) better machining, (2) elimination of heat treating and costly straightening operations, (3) longer service life of parts.



Write For Bulletin #58 for further details.

BLISS & LAUGHLIN, INC.

GENERAL OFFICES: HARVEY, ILLINOIS

SALES OFFICES IN ALL PRINCIPAL CITIES

FOUR PLANTS:—

HARVEY, ILL.

DETROIT, MICH.

BUFFALO, N. Y.

MANSFIELD, MASS.

of iron pickup from dies and other equipment. For this reason, the work should be chemically cleaned. Immerse in a nitric acid solution, then rinse in clear running water and dry.

If the part is too large for immersion, swab it with the acid solution and rinse in water. (The surface must be free of scale, heavy grease and oil for this treatment to be effective.)

Surface Cleaning—To clean chromium-nickel and nonhardenable chromium steels, immerse them for 15 to 30 minutes in a solution containing 10 to 40 per cent 40°Be nitric acid by volume at 120 to 140° F. Follow with a water rinse.

For highly polished parts of all types and for the 400 series hardenable grades, immerse in a solution of 18 to 22 per cent 40°Be nitric acid by volume with a sodium dichromate addition of 2 to 4 per cent by weight. The dichromate prevents clouding of the surface. Bath temperature is 110 to 120°F; treatment time is 15 to 30 minutes. Follow with a water rinse.

Equipment—To protect workers, cover acid baths with wooden or rubberized steel hoods (nitric acid will attack some types of rubber). Exhaust fans are necessary to eliminate toxic fumes.

Steam lines immersed in the acid speed up pickling by keeping the heated fresh acid solution in constant contact with the stainless surface. These lines should have hand control valves. Agitation set up by this treatment also helps remove loose scale.

Tank Materials—For sulfuric acid solutions, recommended tank materials are wood, uncoated or coated with asphaltum or bitumastic; lead lined steel or acid resisting bricks.

For nitric-hydrofluoric acid solutions use: Wood; carbon brick supported by steel or concrete well insulated and cemented; or carborundum brick supported by steel tank with ¼-in. rubber covering.

Plain carbon steel is satisfactory for alkaline and molten caustic solutions.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Improves Braze Jig

Silver solder doesn't stick to carbide pads. They last longer and save hours of filing

CEMENTED carbide pads prolong the life of silver soldering jigs at H. A. Selmer Inc., Elkhart, Ind.

The firm previously used stainless steel for jig parts in contact with the work (tiny nickel-silver parts for band instruments). It says the carbide version saves many hours of hand filing and cleaning of parts and jig pads.

Coating—Once the carbide has been heated sufficiently to form a thin, tight layer of oxide, neither silver solder nor parts stick to the pads. Soldering temperatures are between 1500 and 1600°F.

Depending on the assembly, jigs hold from three to seven pieces while an operator manipulates the torch and silver wire. The illustration shows a typical soldering operation. Assembly consists of a small piece of wrought tubing, two nickel-silver castings, a pad cup of sheet metal, and an adjusting lug.

CARBIDE
. . . prevents sticking

End pins on the jig hold the tubing while the castings, sheet metal pad cup, and adjusting lugs are soldered to it. The visual guide assists the operator in aligning the several parts.

Cemented carbides have eliminated the need for filing away excess solder. Important elements of the jigs were often filed away, increasing the cost of replacement.

Corrosion — The carbide pads also resist the oxidizing effects of oxygen and city gas which are used to fuel the soldering torch.

GENERAL REFRACTORIES

bonding mortars FOR THE STEEL INDUSTRY

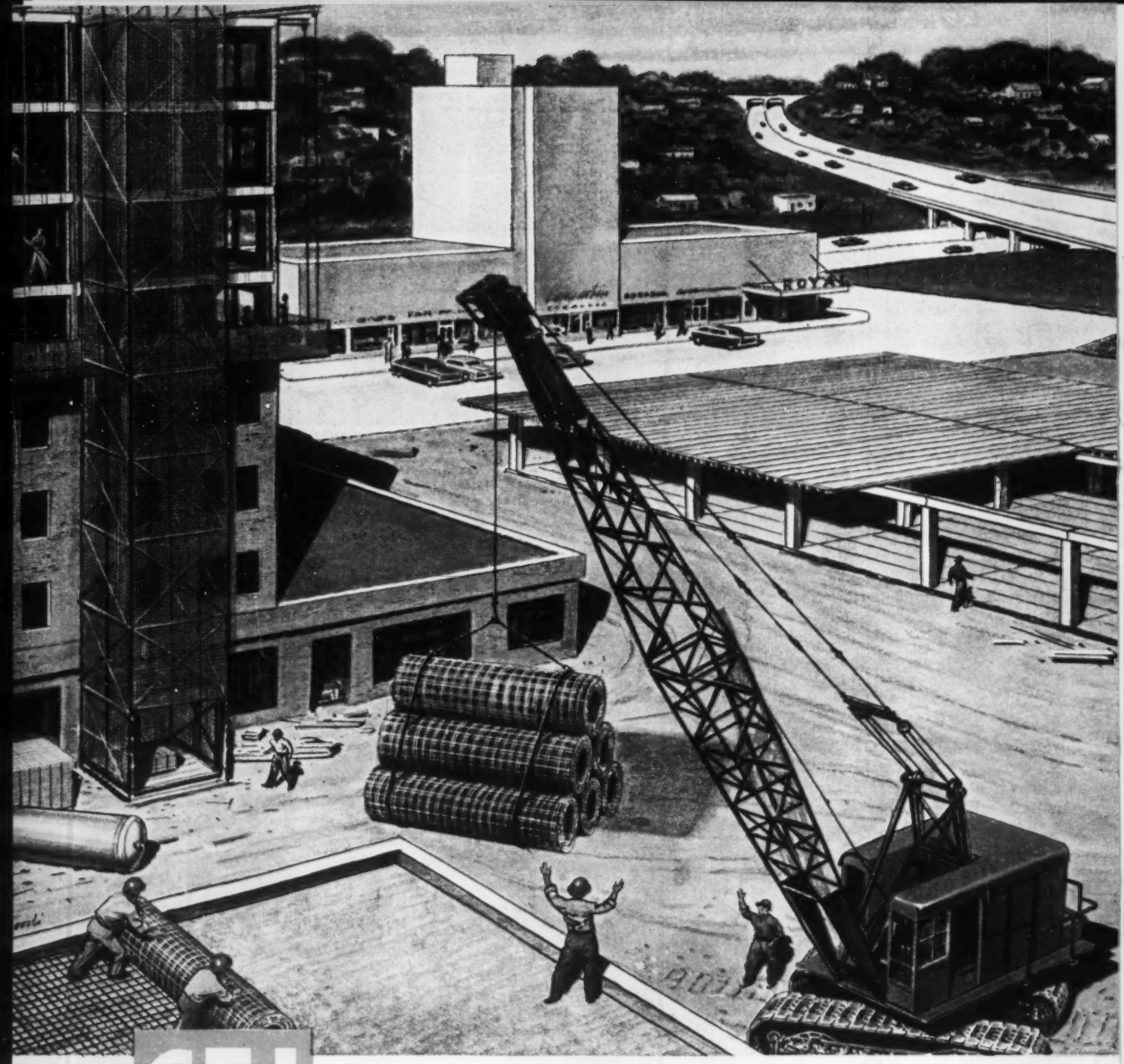
Grefco offers a wide variety of air-setting and of heat-setting high temperature bonding mortars of both the dry and wet varieties. Here are just a few:

BRIKLOK is a super duty, air-setting, fireclay base mortar which sets hard and develops high strength merely upon drying. It is widely used for laying, coating and patching fireclay and silica brickwork. BRIKLOK has good resistance to slag and abrasion and withstands temperatures up to 3056°F. BRIKLOK A is a wet mixture while BRIKLOK is furnished as a dry powder.

GREFCO SILLIMANITE is a highly refractory mortar with a base material consisting mainly of mullite crystals. This insures very high refractoriness and freedom from shrinkage at high temperatures. This high quality mortar is recommended for laying up and coating fireclay, high alumina or SILLIMANITE brick, and should always be used wherever a mortar is required for the latter.

SILLIMANITE 343 is a wet air-setting mixture. SILLIMANITE 340 is a dry heat-setting mixture. Consult your Grefco representative as to which of the several varieties best suits your needs.

GENERAL REFRACTORIES COMPANY
Philadelphia 2, Pa.



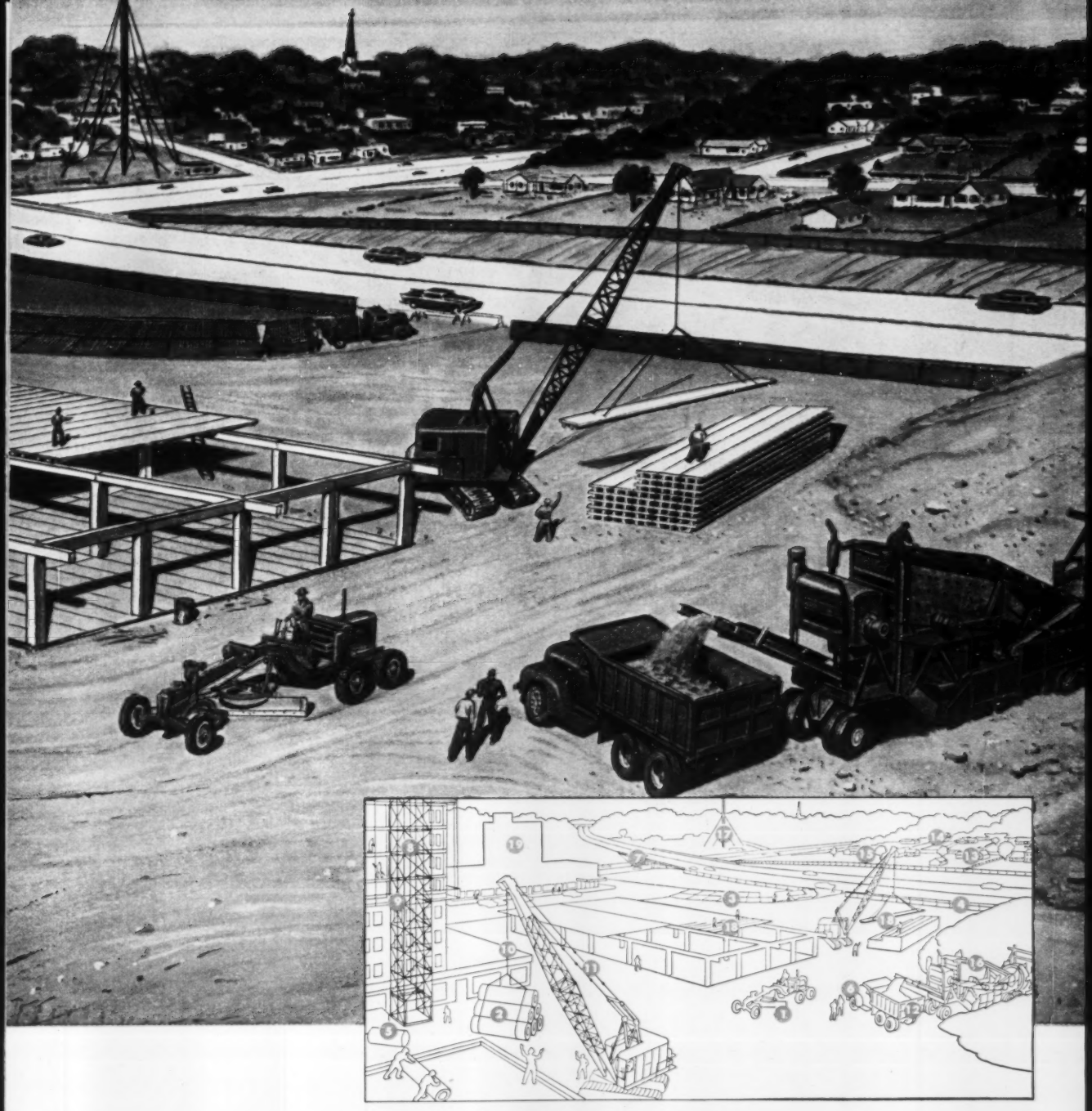
CF&I

STEEL PRODUCTS... used from the ground up

A seemingly endless variety of equipment and materials flow into the construction site for a modern suburban development project. Many of these are made of steel—from structural members to fabricated components... from materials handling to construction equipment. The logistics problem is a complicated one for all the contractors involved.

That's why many contractors... and other big steel users ... are turning to CF&I as a single source for many of their steel requirements. CF&I manufactures a complete range of steel products—those shown here and many more. And steel buyers know they can count on quick delivery when they order from this completely integrated producer... know they can count on the top quality that has long been a CF&I trademark.

If you use steel in any form it will pay you to contact the CF&I Sales Representative nearest you.



in suburban development

1. CF&I Cutting Edges
2. Clinton Welded Wire Building Fabric
3. Clinton Welded Wire Road Fabric
4. Realock Chain Link Fence
5. Claymont Flanged and Dished Heads
6. Wickwire Springs and Formed Wires
7. Claymont All-Welded Steel Girders
8. Wickwire Elevator Cable
9. CF&I Hardware Cloth
10. Wickwire Wire Rope and Slings
11. Wickwire Boom Pendants
12. Claymont Alloy Steel Plates
13. Gold Strand Insect Wire Screening
14. CF&I-Wissco TV Guy Wire
15. Perfection Door Springs and Quick Hitch Gate Springs
16. CF&I Space Screens
17. CF&I Galvanized Steel Strand
18. CF&I Prestressed Concrete Strand
19. CF&I Reinforcing Bars (in concrete)

THE COLORADO FUEL AND IRON CORPORATION

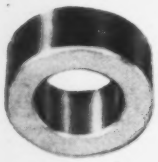
THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo Salt Lake City • San Antonio • San Francisco • San Leandro • Seattle • Spokane • Wichita

WICKWIRE SPENCER STEEL DISIVION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

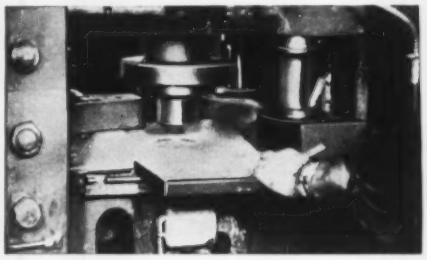
CF&I OFFICES IN CANADA: Montreal • Toronto

5544

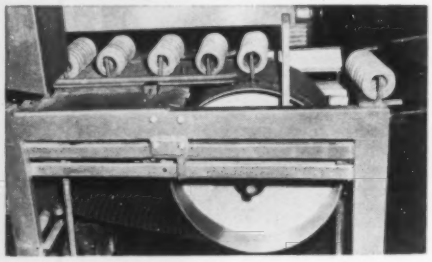
Infiltration—4 Steps



SKELETON BODY



COMPACTING — Infiltrants are molded to the desired size, density, and shape in a 350-ton multimotion press



SINTERING—Iron skeletons are sintered at 1850° F in a belt conveyer furnace with a controlled atmosphere

INFILTRANT BODY

How To Give Powdered Metals Strength

By filling pores with another metal, notch effects are eliminated. Physical properties can be controlled over a wide range by varying conditions and materials used

YOU can give powdered metal parts properties that are competitive with those of high tensile alloys by filling their pores with a second metal.

The infiltration process offers a simple way of doing this. It is being used by the Powdered Metals Div. of Eaton Mfg. Co., Coldwater, Mich.

By varying manufacturing conditions and materials, physical properties can be controlled over a wide range.

Principle—"Compacts of copper and the base metal are formed by conventional methods. The compacts are placed together, then passed through a furnace under a protective atmosphere at a temperature above the melting point of copper," states Robert L. Pettibone, general manager at Eaton.

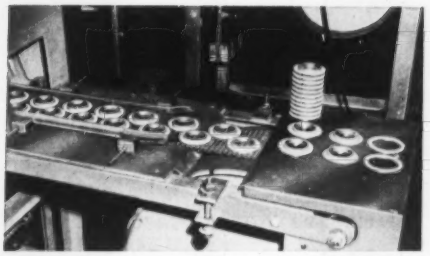
Melted copper is taken into the pores of the iron or steel compact. Capillary action fills the pores, and the infiltrated compact will be of full theoretical density.

Increased Strength — By filling the porous areas with copper, the particles are brazed together, and the notch effect created by voids is eliminated.

Physical properties are controlled by varying the density of the iron or steel skeleton between 70 and 85 per cent of theoretical density.

Substituting iron and carbon combinations in place of pure iron for the skeleton material will greatly affect the range of properties. In addition, there are after-

ASSEMBLY



INFILTRATION—It takes place at 2060° F in a reducing atmosphere as a result of capillary action

COINING—Size changes are under calculated control. Here close tolerance parts are coined in a 350-ton press

treatments which will influence plain iron and copper since they are precipitation hardening alloys, and iron with carbon and copper reacts the same as plain carbon steels.

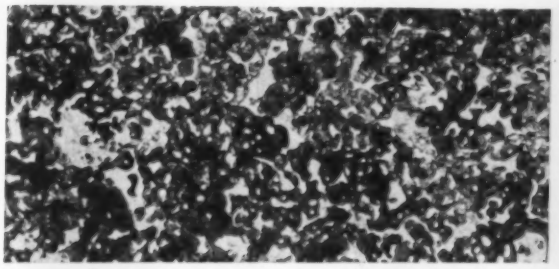
To gain these properties, you must understand the science of powder metallurgy—tool and die design for presswork, the sintering process, proper selection of infiltrant, and the coining of compacts to correct density and size.

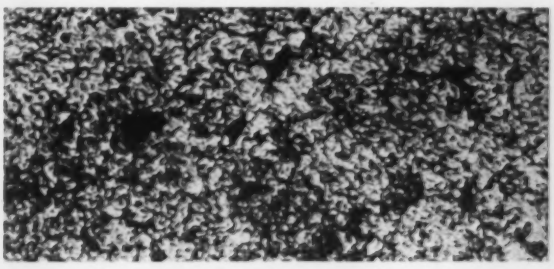
Sintering — There are three types: 1. The metal or alloy remains in the solid state during the entire treatment. 2. A liquid phase is present during the entire cycle. 3. A liquid phase is formed during the process but disappears before sintering is completed. Infiltration requires sintering in the solid state (type No. 1).

Volume changes inherent in powdered metal processes are under calculated control at all times during infiltration. Later machining or grinding operations are not necessary in most cases, even if the parts are used for close tolerance applications.

Skeleton — Two basic compact densities are useful and give different ranges of properties. 1. Skeleton density of 75 per cent iron with no carbon additions results in good elongation and reduction in area. 2. An 85 per cent dense compact, 1 per cent carbon, gives good tensile properties and Rockwell hardness.

If carbon additions are not used,





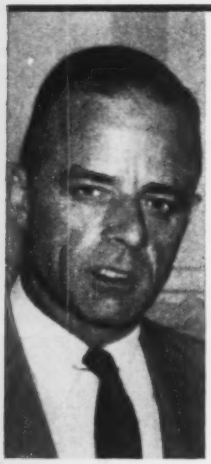
Microphotographs (X200) compare 85 per cent iron skeletons. Part on the left is before infiltration, the other part shows how copper infiltration has filled the pores to give a dense product for added strength

specialized

Does business publication advertising pay?

No one is in a better position to give a hard-boiled, practical answer to this question than the men who spend their working lives on the sales front ... the men the ads are supposed to help ... the men who sell.

Here are the statements of salesmen who know what advertising does for them when it appears in the industrial, trade or professional publications that serve the specialized markets to which they sell:



Bill Kramer
Monsanto Chemical Co.
sells to industry

says Mr. Kramer:

"We make many different chemicals, mostly standardized products that don't have trade names. Many of our chemicals are purchased in small quantities direct and through distributors. So you might think that all I have to sell is price. That's not true. Thanks to our advertising in business papers the name '*Monsanto*' is known to stand for quality products and service.

"We have so many small customers I can't call on all of them, so advertising must carry a large part of the load for the small orders we get from such people which add up to a great deal of tonnage. Advertising also gets across the fact that we warehouse standard chemicals right here in the city and can give prompt service.

"We have such a long list of chemicals that I wouldn't do much of a sales job if I just read the list of chemicals we make on each sales call. So again our company uses advertising to let the people know all the different chemicals we are prepared to deliver. Then we salesmen can concentrate on the individual prospect's immediate requirement.

"Of course you don't always know exactly what chemicals are required by a particular prospect because a company can go into a new product, or a variant of an old one, almost overnight and come up with a need for a chemical he'd never used before. So it's pretty important for our advertising to remind all buyers just what lines we have.

"Although many of our chemicals don't have trade names, we have one silica product that has become known to the trade as '*Santocel*'. Very few people in the trade call this by its proper chemical name – they refer to it as '*Santocel*'. Advertising in the trade papers has created this new name and made it stick. These are just some of the ways I know advertising is working for me – calling on people I can't get to see and calling more often than I can possibly do in person, and suggesting new uses for our products."

Harold Robus
Shuron Optical Company
sells to wholesalers

says Mr. Robus:

"My direct customers are wholesalers—distributors with optical laboratories who sell to and fill prescriptions for optometrists, ophthalmologists and opticians. These men in turn are my secondary, though nonetheless important, customers. I do a lot of so-called missionary work with them, and I also write. a lot of orders that are billed, of course, through the wholesaler of their choice.

"My company's trade advertising in professional journals is directed to these men who examine eyes and dispense eyewear. It has several purposes. First, it sells the company and its policies. Then we use it to introduce new products and all important specifications such as styles, colors, sizes and availability. Another aim of our advertising is to keep the 'retailer' sold on products that he has ordered from me or from his wholesaler.

"I know our advertising does a job when I hear constant references to 'the SHURON ad I saw recently' or 'that new frame I saw in your ad.'

"It has been my experience that all three types of advertising are important, but that keeping the 'retailer' sold on SHURON products is the most vital. It helps bolster his confidence in his own judgment and cuts down my competitors' chances of selling him between my calls.

"Yes, I list advertising as No. 2 in importance in selling our products. When I put it in second position I put it ahead of salesmen. Here's the way I see it. Number one—you have to have a good product. Number two—you have to have a good advertising campaign. Number three—you have to have good men to follow up the advertising.

"That's my opinion."

Glen Chase
Yarnall-Waring Company
sells to industry

says Mr. Chase:

"I have been selling *Yarway* products for over seven years, and I'll have to admit that I've taken the trade paper advertising for granted. But when I stop to think I realize it's out there working for me all the time.

"For instance, I never have to tell my prospects who YARNALL-WARING is, or what they make. Often I don't even have to tell them why they should see me and find out what I've got to offer. The advertising has done much of the *who, what,* and *why* of selling before I make my contact.

"Here's an example: I recently had a phone call from a potential customer that I'd never even called on. He was having trouble with a competitive product. He'd seen our ads and wanted to try my product. That's one time when my sale consisted merely of writing the order. Advertising really made the sale.

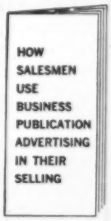
"The advertising has given people a good impression of our company, too. This is surprising, when you stop to think about it, because we are a relatively small organization.

"Our company name is YARNALL-WARING but a great many people say *'Yarway'*. I believe this use of our trade-mark may be due to the wide use of the company trade-mark in our trade paper advertisements, on our product name plates, shipping cartons and stationery."

Ask your own salesmen what your company's business publication advertising does for them. If their answers are generally favorable, you can be sure that your business publication advertising is really helping them sell. If too many answers are negative, it could well pay you to review your advertising objectives—and to make sure the publications that carry your advertising are read by the men who must be sold.

How salesmen use their companies' advertising to get more business

Here's a useful and effective package of ideas for the sales manager, advertising manager or agency man who would like to get more horsepower out of his advertising. Send for a free copy of the pocket size booklet entitled, "How Salesmen Use Business Publication Advertising in Their Selling," which reports the successful methods employed by eleven salesmen who tell how they get more value out of their companies' advertising.



You'll find represented many interesting variations in how they do this. Some are very ingenious; all are effective. You can be sure that more of your salesmen will use your advertising after they read how others get business through these simple methods.

The coupon is for your convenience in sending for your free copy. Then, if you decide you want to provide your salesmen with additional copies, they are available from NBP Headquarters in Washington, at twenty-five cents each. Or if you choose you can reprint the material yourself and distribute it as widely as you please. But first, send for your free copy.

NATIONAL BUSINESS PUBLICATIONS, INC.

NBP

...each of which serves a specialized market in a specific industry, trade or profession.

NATIONAL BUSINESS PUBLICATIONS, INC.
Department 5A
1413 K Street, N. W.
Washington 5, D. C. **STerling 3-7533**

Please send me a free copy of the NBP booklet "How Salesmen Use Business Publication Advertising in Their Selling."

Name _____

Title _____

Company _____

Street Address _____

City _____ Zone _____ State _____

Heat Treatment and Physical Properties

Material Type	Final Analysis Iron	Final Analysis Copper	Final Analysis Carbon	Annealing Temp°F	Heat Treat Temp°F	Draw Temp°F	Yield Strength psi	Ultimate Strength psi	Elongation %	Reduction of Area %	Rockwell Hardness B
75/25	75	25	—	1500 Slow cool	950 4 hours Slow cool	—	35,000 40,000	60,000 65,000	20 25	20 25	70 75
75/25	75	25	—	1500 Slow cool	1550 Water quench	—	85,000 90,000	115,000 125,000	7 10	7 10	95 100
85/15	84	15	1	1500 Slow cool	1500 Water quench	1050 1 hour	115,000 125,000	160,000 180,000	4 6	4 6	110 115

a reducing atmosphere is desirable, but when carbon additions are used, a slightly carburizing atmosphere is essential.

Coining must not be done on skeleton compacts because they will close the interconnecting pores and prevent complete penetration.

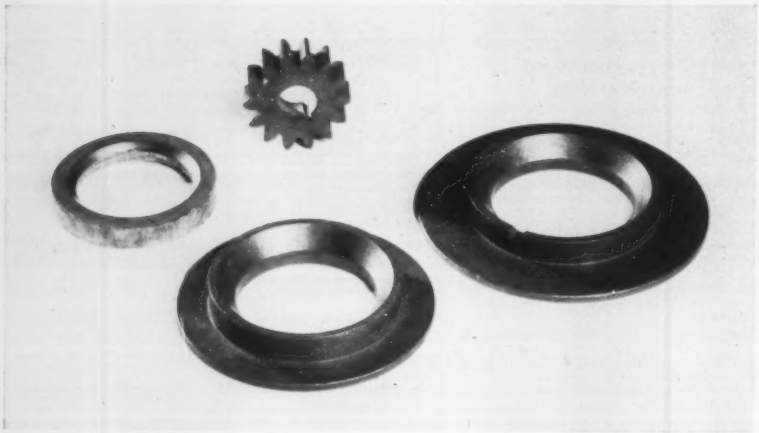
Best results are obtained when the infiltrant comes in close contact with the skeleton so that capillary action will fill the pores. The purity of the copper used is relatively unimportant.

Copper has good wetting properties under the proper atmosphere; it is necessary to have the infiltrant compacts of the exact weight. Too much will leave an excess on the surface and too little will result in low density and loss of strength.

Excesses left on the part will be difficult to remove and require machining.

An addition of an easily oxidized material will help prevent density variations. The additional element will oxidize and help retain any reasonable amount of excess infiltrant.

The resultant excess is easy to remove since there is no tendency for wetting. Manganese is one of several elements that will serve this purpose.



Parts of varying shapes can be produced with the infiltration process

Molding the skeleton with a small area or projection which is not part of the final piece will make the process much easier and adaptable. The gate can be sliced off after it retains the excess infiltrant.

The projection helps to eliminate the problem of surface erosion that is caused by the solubility between iron and molten copper. It can also be reduced by adding a small amount of iron powder to the infiltrant. Solubility occurs within the part.

Size Control—Small amounts of carbon added to the iron skeleton material will help control the size change during the infiltration cycle.

Coining is needed if tolerances are less than plus or minus 0.002 in. An anneal prior to coining will reduce the press tonnages needed.

Heat Treating—The cooling rate from the infiltration temperature has an influence on the final properties. The chart above indicates the best treatments.

The effects of heat treating should be carefully studied before the parts are run in production. Size changes and distortion normally occur.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

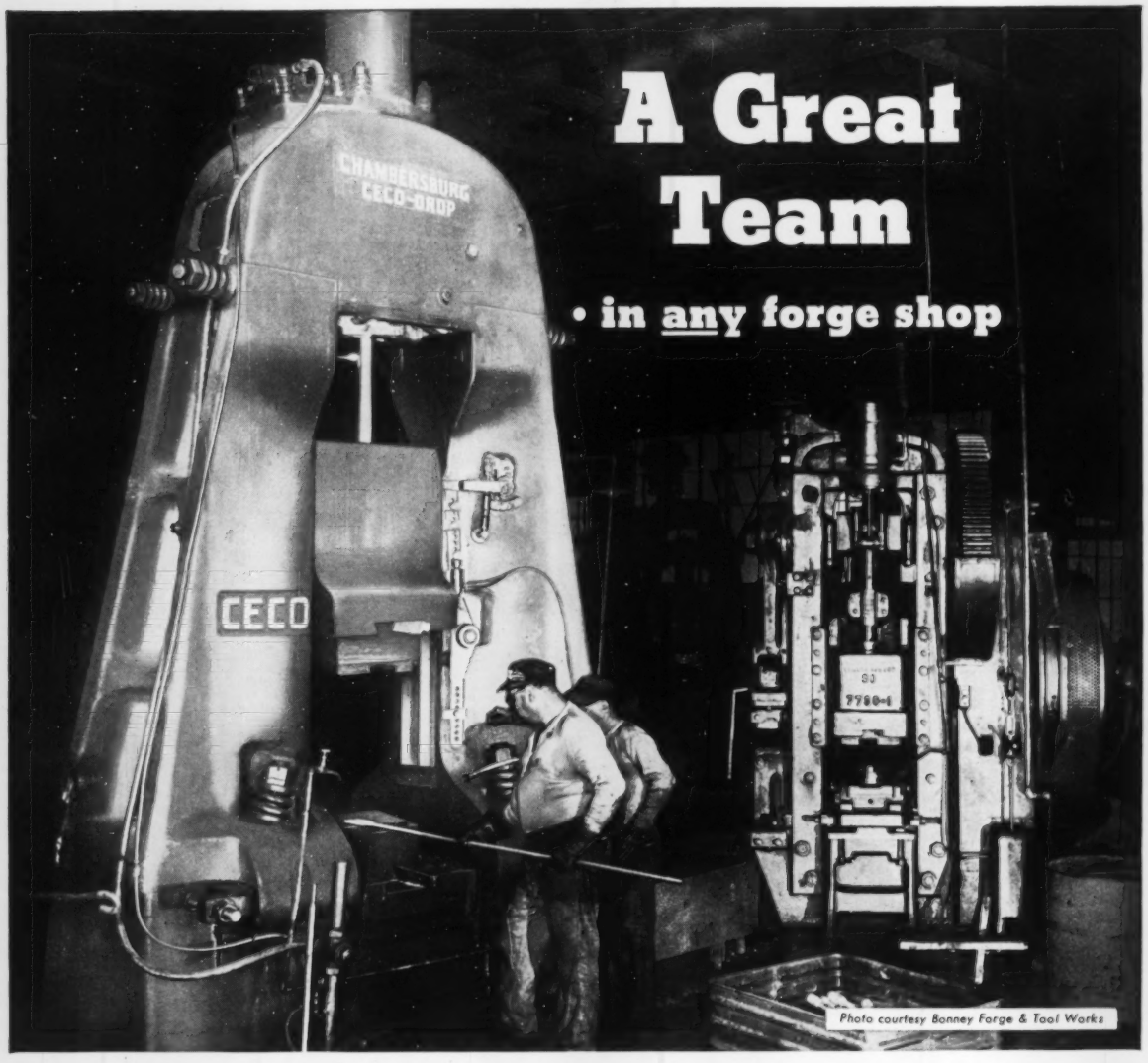
Roebling Tire Bead Wire: Packaged for Maximum Benefit

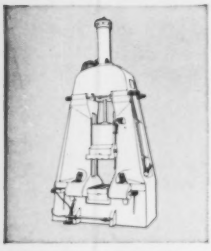
The problems eliminated by this unique reel-less core packaging system are manifold. Loads are palletized two cores per pallet and may be stacked two or three high. This, plus the fact that you need not accumulate empty reels means storage space requirements are cut to *less than half*. You do away with all freight and handling costs on reels, the bother and expense of "bookkeeping" returnable reels, and the freezing of money in reel deposits.

This is typical of Roebling's advanced packaging methods—that makes handling Roebling high-quality wire so much easier. For details on this efficient Roebling Tire Bead Wire packaging method, or information on other types of Roebling wire, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation





CHAMBERSBURG CECO-DROP

- Piston-lift • Gravity drop
- Costs less to operate
- Forges more minutes per hour
- Forgings made faster
- Operation is easier and safer
- Maintenance is cheaper
- Full stroke or short stroke without interruption
- Over 400 in service in over 100 forge shops

Ceco-Drop and Trimmer

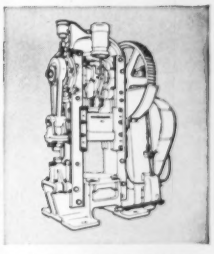
• • *for top production*

When the chips are down, it is continuous, trouble-free, quality production that puts you ahead of competition. That fact explains why the Ceco-Drop (in combination with the "indestructible" Chambersburg Trimmer) has become in nine short years, the standard gravity drop hammer of the forging industry.

Write for descriptive Bulletins

CHAMBERSBURG ENGINEERING COMPANY
CHAMBERSBURG PENNSYLVANIA

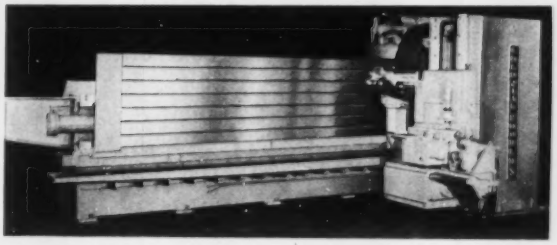
ALSO BUILDERS OF THE IMPACTER



CHAMBERSBURG FORGED STEEL SIDE TRIMMING PRESS

- Exceptional strength
- Jam-proof. Functions perfectly after stall-test
- Uses minimum floor space
- Accessible front and back
- Friction-slip Flywheel
- Interlocking forged steel side construction
- Low power consumption
- Safe
- Single or Double Crank

Sculpture Machine Has Spindle Speeds from 36 to 1900 rpm

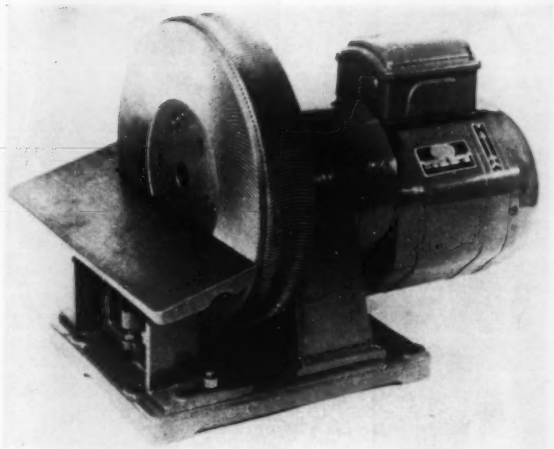


Contour and profile milling are done by two models of hydraulically driven sculpture machines.

The large vertical slide has the rigidity needed for high metal removal. Both work and template are mounted on the vertical face of the ram.

Both models use cross travel of 24 in. One has a 120-in. stroke, the other a 144-in. stroke. *Write*: Colonial-Romulus Div., Colonial Broach & Machine Co., Park Grove Station, Detroit 5, Mich. *Phone*: Jefferson 6-2550

Rotary Power Tool Saves Filing Time



The R-Filemaster does production and toolroom tasks such as filing, shaping, and milling three to ten times faster than they can be done by hand.

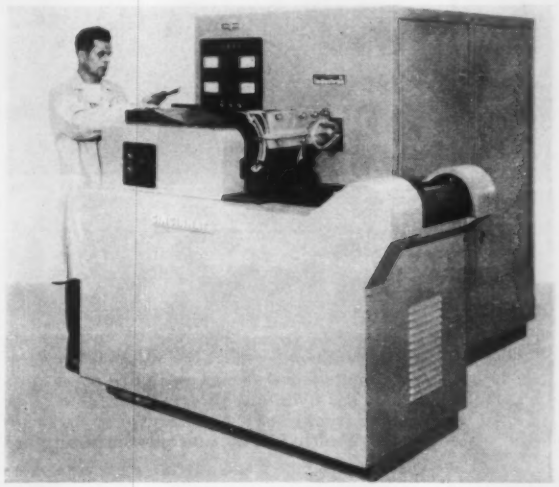
Bar stock, castings, and extrusions of steel, iron, copper, brass, and other materials are handled by the machine.

A specially hardened tool steel is used for the curved teeth of the machine. Rake of the cutting edges and curvature of the teeth are designed to form a rolling chip which is eliminated radially.

A 1-hp motor with speeds of 120 and 240 rpm drives the filing tools by means of a spur gear reduction unit.

Rings are available in fine, medium, and coarse cut. *Write*: Hudson Automatic Machine & Tool Co., division of Alfred Hofmann Needle Works Inc., 137-139 38th St., Union City, N. J. *Phone*: Union 3-0200

Induction Heater Uses Frequencies up to 1000 Kilocycles



Selective hardening of parts on a high production basis is possible with the Inductron. It can also be used for annealing, brazing, soldering, tempering, stress relieving, shrink fitting, and other high frequency heating applications.

The high frequencies used provide rapid heating and production rates that enable the machines to be incorporated into production lines.

The high frequencies also confine the heating to the skin surface for minimum depth of case, narrow transition zones, freedom from scale, and minimum distortion.

Individual metering of oscillator tubes simplifies setup, operation, and maintenance. Filament voltages are regulated within 1 per cent of nominal voltage.

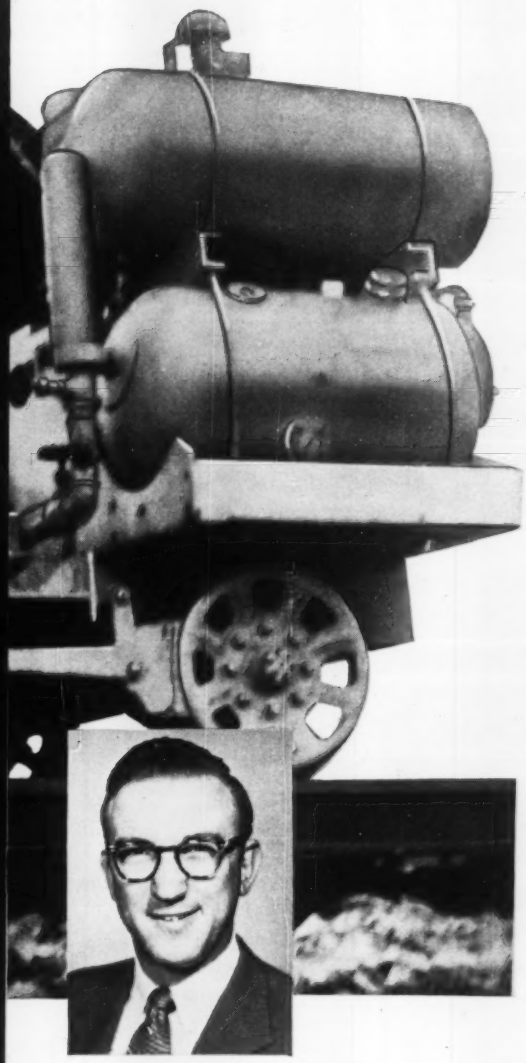
A variable output work unit is available to permit use of a single coil to accommodate a wide range of parts. *Write*: Process Machinery Div., Cincinnati Milling Machine Co., Cincinnati 9, Ohio. *Phone*: Redwood 1-2121

You can't drive spikes

SpikeMaster uses pneumatic power to drive four spikes at a time. Welds must withstand machine-gun bursts of impact. SW-44 electrodes make it seem easy.

SpikeMaster shown with one set of driving guns operating . . . the other in travel position. Both sets operate simultaneously when desired. The self-propelled unit has hydraulic powered turntable . . . removes itself from track. All critical welds are made with A. O. Smith SW-44 iron powder electrodes.

with a tack-hammer!



The man from A. O. Smith

Byron Motl is the A. O. Smith welding consultant who worked with Railway Maintenance Corporation. More than a salesman, he's a trained welding specialist . . . ready and eager to help with production problems.

RMC SpikeMaster has driving power built-in; welds made with A. O. SMITH SW-44 electrodes provide guts for working on the Railroad

First, you nip the railway tie up firmly against the rails. Then you drive four spikes—one on either side of both rails. All at a rate of better than 4 or more ties per minute. It's quick and *easy* — with Railway Maintenance Corporation's SpikeMaster.

EASY . . . because these fast-working units are built to deliver sure spike-driving power without faltering in tough mainline service.

Like all RMC railroad maintenance equipment SpikeMaster features welds made with A. O. Smith SW-44 electrodes on heavy-gauge steel components.

An iron powder electrode (AWS class E-6024), the SW-44 excels in high-speed operation . . . deposits far more tough weld-metal than conventional rods. Actually, many users report the SW-44 cuts welding time 25% . . . electrode cost by as much as 10%. Speed and strength are far from all. You get smooth, self-cleaning welds . . . the quality look that sells your product.

Want more facts about the SW-44 and other top-performing electrodes? Call "Your man from A. O. Smith" . . . or write direct.

Through research A.O. Smith *. . . a better way*

A.O.Smith

CORPORATION

WELDING PRODUCTS DIVISION

Milwaukee 1, Wisconsin

A. O. Smith INTERNATIONAL S. A., Milwaukee 1, Wisconsin, U. S. A.

NEW PRODUCTS and equipment

Toolholders

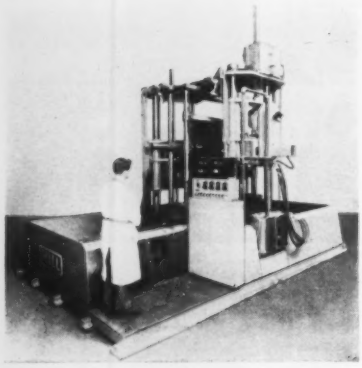
The Lift-O-Matic line of Carboloy toolholders has a chipbreaker-clamp that functions automatically.

The holder has only five parts. The clamp and chipbreaker are combined into one unit which lifts or lowers automatically as the clamp screw is turned.

The chipbreaker-clamp has a carbide coat fused right to the chipbreaker surface to eliminate braze failure. The chipbreaker is held at a fixed distance from the cutting edge for positive chip control. *Write*: Metallurgical Products Dept., General Electric Co., Detroit 32, Mich. *Phone*: Jefferson 6-9100

Drilling Machine

This opposed spindle machine automatically positions heads and table for producing hole patterns. It is used for drilling holes in tube sheets and baffles for condensers, heat exchangers, evaporators, heaters, and all types of heat transfer equipment, including that for atomic energy powerplants.



The machine will handle sheets and baffles up to 6 ft in diameter and 10 in. thick. It produces holes at feed rates up to 18 ipm with conventional oil-flute drills.

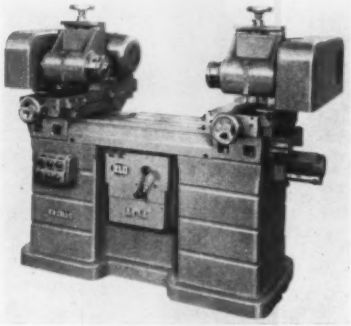
Uniform, straight, round holes are produced in a single drilling operation without reaming. *Write*: Walter P. Hill Inc., 22183 Telegraph Rd., Detroit 19, Mich. *Phone*: Kenwood 4-9190

Boring Machine

The 1212-B model can be adapted to production, semiproduction, or toolroom operations.

A wide variety of workpieces can be handled when the machine is equipped with special vertical and horizontal spindle slides.

There is 2 in. of vertical spindle adjustment between 9 and 11 in. from the spindle centerline to the table. This combined with a 4-in. horizontal adjustment permits an infinite number of boring tool positions. The bridges can be spaced relatively wide apart for medium size parts or close together for smaller work.



Both ends of the machine may be operated in the same setup, or operated individually in separate setups. *Write*: Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. *Phone*: Townsend 8-3900

Tapered Roller Bearings

The Duo-base seal combines the features of the outside diameter seal and the face type. The new seal is available in seven sizes of bearings from 0.750 to 2.6875 in. bore.

An outside diameter seal is provided by one lip which operates in the bearing housing bore. The other lip operates against the smooth, flat, hardened, and ground face of the bearing cup to provide face-type sealing. *Write*: Timken Roller Bearing Co., Canton 6, Ohio. *Phone*: Glendale 3-4511

Ultrasonic Cleaning

This liquid detergent, No. 715, is used to speed the cleaning of precision parts, ball bearings, and clock type mechanisms.

The detergent acoustically conditions the cleaning solutions to provide maximum dirt removing action. *Write*: Dept. 715, Acoustica Associates Inc., 26 Windsor Ave., Mineola, N. Y.

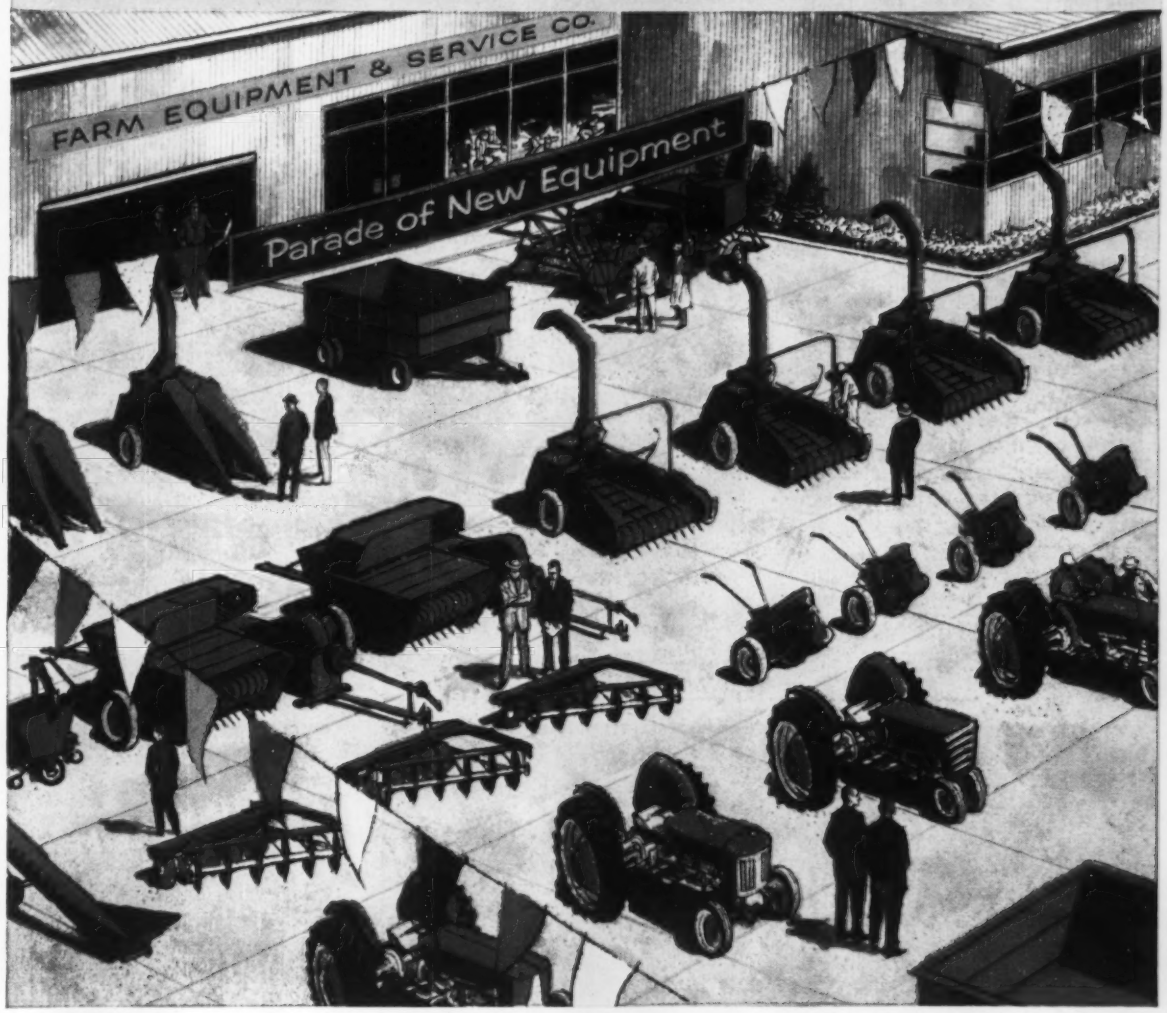
Testing Machine

In the Mark G Servomatic tester, the center of test remains at the same point regardless of the length of the specimen or amount of extension.

This is achieved by making the two crossheads pull against or

STEEL SETS THE PACE in farm equipment...

Farm Equipment manufacturers used 1,082,459 tons of steel last year.
Steel is the **most used metal** in modern technology.



J & L sheet steel sets the pace in helping you control PRODUCT QUALITY

As an integrated company, Jones & Laughlin controls quality from iron ore through every production operation. Rigid quality control of J&L sheet and strip steel assures formability, uniformity and top drawing qualities to meet your most exacting specifications.

J&L sheet and strip are supplied in hot or cold rolled coils and cut lengths, in carbon grades, in widths up to 90" dependent upon gage. This permits forming products in one piece, eliminating welds and permitting more modern styling. Wide widths can also be supplied in high tensile, low alloy grades where higher strength or reduction in section is required.

Write for complete information to Jones & Laughlin Steel Corporation, Dept. 404, Three Gateway Center, Pittsburgh 30, Pennsylvania, or call your local J&L district office.

STEEL

Jones & Laughlin

...a great name in steel

compress toward each other.

The test center is easily observed, being 56½ in. above the floor. Auxiliary test equipment (such as ovens) remains in a fixed position for the duration of any test.

Ball and screw mechanisms are used to move the crossheads. The point of contact between the screw and its opposing thread is a ball bearing. This reduces friction and power requirements and adds sensitivity to the response of the machine.

The two ball and screw mechanisms turn simultaneously and go equal distances in opposite directions.

The force measuring system is incorporated in the crosshead. Four load columns in the upper crosshead measure the forces between the crosshead and the nut assembly.

Two electric clutches allow the speed range to be changed while the machine is under load.

The machine can supply alternating loads of 0.6 to 60 cycles a minute. A 10,000-lb model is illustrated. Range of sizes extends to 300,000 lb. *Write*: Electronics & Instrumentation Div., Baldwin-Lima-Hamilton Corp., Waltham, Mass. *Phone*: Twinbrook 4-6700

Gear Generating Machine

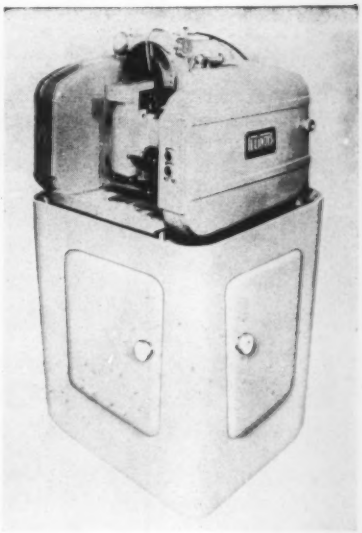
Gerite (TM) is a fine-pitch gear generator that combines the principles of rotating gear blank, tangential feed, and single point cutting.

The machine is particularly valuable for model and prototype work because it requires less than 6 hours from toolup to finished production.

Cutting is done by a single-point tool that can be produced in the user's plant in less than an hour.

The machine generates spur or helical gears to 45-degree helix. Guides or reduced speeds are not required for helical cutting.

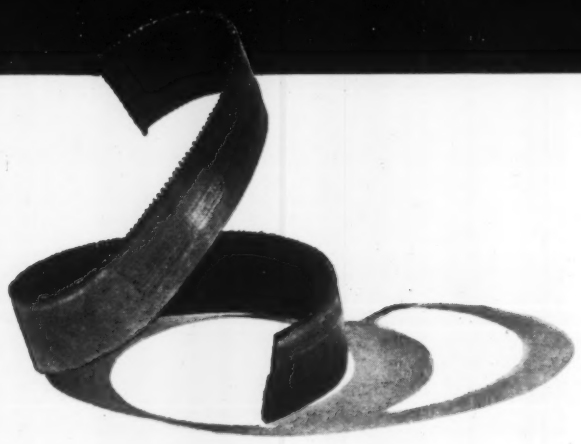
A dial regulates speed from 200 to 1800 strokes a minute. Uniform velocity and proper tooth angle are



held during the full length of cut.

Gears up to 3 in. diameter and ¾ in. length of cutting stroke from 30 to 300 pitch can be generated. Spacing of 6 to 1000 teeth in a gear can be controlled accurately. *Write*: Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill. *Phone*: Capitol 7-2200

LOOK...NO HANDS!

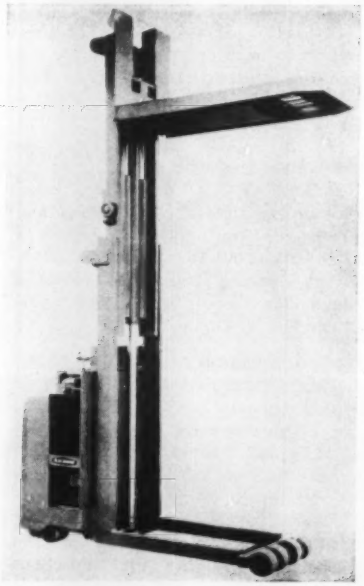


NEW PRODUCTS and equipment

Platform Truck

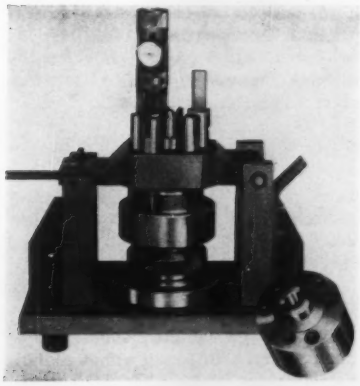
This high lift truck has a capacity of 6000 lb. The truck will elevate to standard heights of 80 and 105 in. Platform lengths range from 30 to 48 in. Widths of 24, 26, and 30 in. are available.

The electric truck can right-angle stack loads 54 in. long and 48 in. wide in 80-in. aisles. *Write*: Raymond Corp., 91-158 Madison Ave., Greene, N. Y. *Phone*: 204



Gage Checks Holes

Con-Chek enables you to check hole location and concentricity without turning your hand or the gage handle. The indicator is read directly.



The gage is available in models from 0.200 to 1.750 in. in diameter. Each model has a range of 0.060. *Write*: Mayes Tool Co., 26514 W. Seven Mile Rd., Detroit 19, Mich. *Phone*: Kenwood 1-5020

Aluminum Crane

This overhead traveling crane uses aluminum throughout except for moving parts such as gears and wheels.

The aluminum plates used in the box section girders and in the trucks and trolley structure are high strength 5456 alloy. Structural members are fabricated from 6061 alloy. All-welded construction is used.

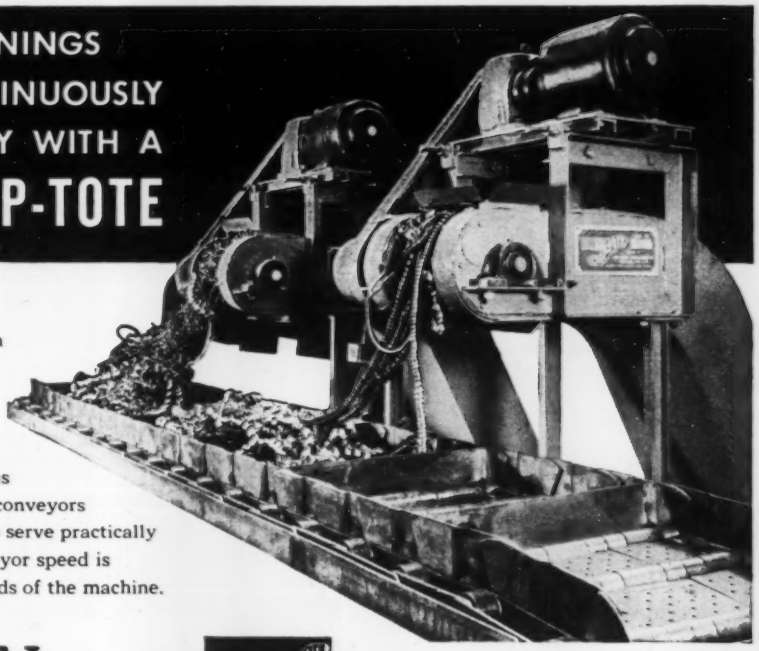
Aluminum castings, where used, are high strength alloys. Bolts are aluminum or stainless steel. All electrical conduit and insulated wire are aluminum.

The footwalk is made of aluminum plates which have a rolled-in nonslip surface.

The crane has a 52-ft span and a

REMOVE CHIPS, TURNINGS AND BORINGS CONTINUOUSLY AND AUTOMATICALLY WITH A

MAY-FRAN CHIP-TOTE



That's right! The May-Fran CHIP-TOTE permits the continuous operation of machine tools by eliminating down-time for scrap removal . . . skilled workers stay on the job . . . production increases by as much as 20%! Versatile CHIP-TOTE conveyors are available in a wide range of sizes to serve practically any type or size of machine tool. Conveyor speed is adjusted to meet the scrap removal needs of the machine.

MAY-FRAN ENGINEERING, INC.
1725 Clarkstone Rd. • Cleveland 12, Ohio

Write today for your copy of Bulletin MF-640.

7721-MF

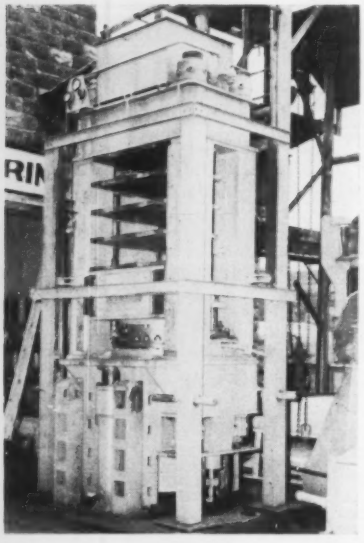
NEW PRODUCTS and equipment

capacity of 12 tons. It weighs 33,500 lb including the bridge motors, control equipment, bridge brakes, footwalk, and conductors. *Write*: Northern Engineering Works, 210 Chene St., Detroit 7, Mich. *Phone*: Lorain 7-3280

1000-Ton Press

This four-column opening press is serviced by a feed table. The press indexes up and down in the four columns like a dumb-waiter.

Electrically heated steam plates are used for making grinding wheels.



Dies can be slid into any of the four openings because the press is indexed accurately.

A safety lock makes it impossible for the press to lower itself should the hydraulic line leak. *Write*: Sepore Corp., 342 Madison Ave., New York 17, N. Y. *Phone*: Murray Hill 2-2558

NEW literature

Write directly to the company for a copy

Tungsten Carbide

This 20-page bulletin covers the manufacture and physical properties of tungsten carbide, grade selection and application, the use of single point tools, and recommended cutting speeds. Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.

Adhesive Bonding

Sizes and operating characteristics of machines that assemble parts by adhesive bonding are described in Bulletin CB-1, 6 pages. Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 38, Mich.

Steel Flooring

Solid and open flooring for floors, stairs, steps, ramps, catwalks, and platforms are described in Bulletin 50-9. Joseph T. Ryerson & Son Inc., Box 8000-A, Chicago 80, Ill.

Screw Machine Products

This 4-page bulletin shows screw machine work in tough alloys including stainless steels, Inconel, nickel, and titanium. Allmetal Screw Products Co. Inc., 821 Stewart Ave., Garden City, N. Y.

O-Rings

A line of O-rings made of various compounds is covered in Bulletin OR-57, 8 pages. Chicago Rawhide Mfg. Co., 1301 Elston Ave., Chicago 22, Ill.

Four-Slide Machines

Operating features and performance characteristics needed for evaluation of an all-purpose, vertical, four slide machine are given in Bulletin V-82, 8 pages. Machine Div., Torrington Mfg. Co., Torrington, Conn.

Centrifugal Fans

Airfoil fans for ventilating and air conditioning, their capacities, and dimensions, are covered in Bulletin 257, 32 pages. Ilg Electric Ventilating Co., 2850 N. Pulaski Rd., Chicago 41, Ill.

Industrial Rectifiers

Direct current power supplies (selenium, germanium, and silicon models) for cathodic protection, battery charging, magnetic chucks, and motor control are described in Bulletin IR-1, 4 pages. Rapid Electric Co., 2881 Middletown Rd., New York 61, N. Y.

Fan Testing

Bulletin 151-57 tells how prototype fans are tested to obtain accurate performance characteristics for a complete series of fans of the same or larger sizes. Air Moving & Conditioning Association Inc., 2159 Guardian Bldg., Detroit 26, Mich.

Magnesium

Properties of magnesium castings and steps in their production are discussed in this 24-page bulletin. Howard Foundry Co., 1700 N. Kostner Ave., Chicago 39, Ill.

Resistance Welders

Bulletin P-101, 6 pages, covers spot and projection press welders of 30 to 700 kva, electrode forces of 1275 to 18,000 lb, and 12 to 30 in. throat depths. Precision Welder & Flexopress Corp., 3520 Ibsen Ave., Cincinnati 9, Ohio.

Speed Reducers

Designs and ratings of worm gear speed reducers of less than 0.1 to 121 hp are covered in this 40-page catalog, J13. Jones Machinery Div., Hewitt-Robins Inc., 666 Glenbrook Rd., Stamford, Conn.

Flame Heating Machine

Design highlights and specifications of a selective flame heating machine are included in this 6-page bulletin. Process Machinery Div., Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

Graphite Heat Exchangers

Data on standards and optional designs of impervious graphite tube and shell heat exchangers are given in Bulletin 448, 8 pages. Falls Industries Inc., Aurora Road, Solon, Ohio.

NEW BOOKS

Radiography in Modern Industry, Second Edition, X-Ray Div., Eastman Kodak Co., Rochester 4, N. Y. 140 pages, $5.

This revised edition contains information on the sensitometric characteristics of Kodak films, data on radioactive isotopes and their use, and a guide for the selection of films for x-ray and gamma-ray radiography.

There is also new material on image amplification, geometric enlargement, and radiation monitoring.

Subjects discussed include the radiographic process, x-ray and gamma-ray sources, geometric principles, factors governing exposure, and radiation protection.

Dorson Screw Company sets high quality standards with KEYSTONE *XL* Wire

KEYSTONE XL WIRE STUDY

Talk to Chester S. Dorch, president and partner in Dorson Screw Company, 2509 West Cermak, Chicago, about cold heading with Keystone "XL" Wire—here's what he'll tell you:

"Our business reputation is based on ability to produce high quality sheet metal and machine screws as well as non-standard and highly specialized parts at a competitive price. Keystone "XL" Wire has been a major factor in helping us meet these standards."

An important reason why Dorson, like other progressive fastener manufacturers, has eliminated rejects, increased die life and has cut costs, comes from the *flowability* of Keystone "XL" Wire. This inherent characteristic of Keystone "XL" Wire makes it possible to produce extreme upset head fasteners of highest quality.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE
WIRE FOR INDUSTRY

Unique, as well as standard screws like those manufactured by Dorson and shown above, become high-speed production items when Keystone "XL" Wire is used. Your Keystone Wire Specialist, backed by a skilled metallurgical staff, will be pleased to assist you in solving your cold heading problems. He will show you how the uniform high quality of Keystone "XL" Wire costs no more—yet means much more in the long run.

Keystone Steel & Wire Company
Peoria 7, Illinois

Brand New . . . COLD HEADING FACTS FOLDER . . . send coupon today! New folder discusses uses, applications, methods, technical facts, wire requirements.

Name_____ Title_____

Company_____

Street_____

City_____ State_____

STEEL-MEN!

Corhart melting-end bridgewall, in tank described below, after 21 months and 6 days of service . . .

WHAT IS A "CORHART BALANCED FURNACE"?

THE term "Corhart Balanced Unit" does not signify a new or unusual design of glass furnace. It is used to describe *your* furnace, just as it stands, except with the more vulnerable parts *fortified* with Corhart Electrocast to that point where *all* parts of the tank—from dog-house to bottom—wear out evenly, each part delivering its full potential of life and service.

The cost of Corhart Electrocast is higher *per ton* of blocks, but analyses of cost and results in many units prove beyond question that it is by far the most economical refractory *per ton of glass produced*. Glass factory profits are determined by the cost of *finished ware* and NOT by the cost of the tank blocks.

The following is a typical example of many actual records:

	CORHART BALANCED TANK	CLAY TANK (AVE. OF 5 FIRES)
Cost, labor and materials	$11,100.00	$8,000.00
Life (days)	648	289
Tons of glass produced	22,087	7,274
Tank cost per day	$17.12	$27.70
Tank cost per ton of glass produced	$0.503	$1.10
Melting area	18 x 32	18 x 32

With the outlook for large tonnage demand and the desirability of continuous operation, such economies as these cannot long be ignored. Corhart Electrocast is the answer to the crying demand for a better glass furnace construction material. Write today for further information and proof of economy. *Address:* Corhart Refractories Co., *Incorporated*, 16th & Lee Sts., Louisville, Ky.

CORHART ELECTROCAST REFRACTORIES

HERE'S an ad of ours that appeared 24 years ago, back when only a few of the most progressive glass manufacturers would use Corhart Electrocast Refractory —"one of the world's highest-priced refractories". Today, however, Corhart Electrocast Refractories are used extensively throughout the world . . .

In 1957, Corhart 104 is still relatively new in the steel industry. It is also "one of the world's highest-priced refractories". Yet it offers open-hearth furnace operators the same opportunities for greater production and lower costs that Corhart Electrocast brought to glass manufacturers.

May we tell you the whole Corhart 104 story? Address: Corhart Refractories Co., *Incorporated*, 1642 West Lee Street, Louisville 10, Kentucky, U.S.A. SPring 8-4471.

QUALITY · ECONOMY · ENDURANCE

CORHART 104 ELECTROCAST REFRACTORY

The words "Corhart" and "Electrocast" are registered Trade Marks which indicate manufacture by Corhart Refractories Company, *Incorporated*. Corhart Refractories Co., *Incorporated*, 1602 West Lee Street, Louisville 10, Kentucky, U.S.A.—Telephone SPring 8-4471

Market Outlook

AUTOMOTIVE buying is perking up a bit, but volume is not heavy enough to give the steel market a lift.

Consumers are still cutting inventories, buying largely against needs in sight, and requesting prompt shipments, which are readily available in all products except heavy plates and structurals.

INVENTORY CONSCIOUS—Many users are reducing stocks to the minimum. They are encouraged by growing availability of quick shipments. Others are reducing stocks for tax purposes, or to improve their dollar position.

Auto builders, though, are starting to build slightly larger inventories than the two-week supplies they've been averaging. While still ordering cautiously, their buying seems less hand to mouth than it has been.

USE EXCEEDS DEMAND—There is increasing evidence that consumption of finished steel is outstripping buying by a substantial margin. Indications are consumption this year will set an all-time record at around 85 million net tons. Shipments from the mills will not exceed 84 million tons.

COMPETITION MOUNTS—Absence of large-scale forward buying is mirrored in smaller steel order backlogs. This is giving rise to growing competition for business.

A softer price tone is also developing. Premium quotations have just about disappeared, and more freight is being absorbed by mills.

HOPE FOR PICKUP—Lowering of the Federal Reserve discount rate at several points is encouraging the hope that finished goods buying will be stimulated, which will expand forward demand for steel products.

Auto purchasers will place heavier orders once reaction to the new cars can be appraised. Appliance makers, notably refrigerator and laundry equipment interests, are stepping up orders 10 to 15 per cent.

Leading steelmakers now think 1958 consumption will approach this year's volume, though production may be down about 5 per cent.

PRODUCT AVAILABILITY—Even items that have been in tight supply show signs of easing. Demand and output of heavy plates and wide flange structurals are expected to come into balance in the first quarter. There is now more flexibility in scheduling and shipping the heavy products, including tubular goods.

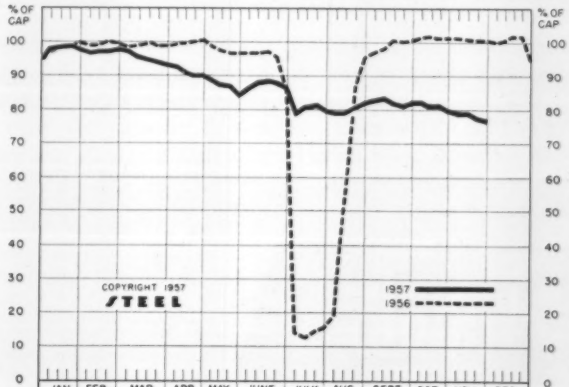
Sheets and strip in the various categories are readily available. The same can be said for bars, including alloys.

OPERATIONS SAG—The national ingot rate is still dipping. Last week it fell another point to 76.5 per cent, the lowest level since 1954 except for strike periods and holidays.

Despite the slower percentage pace, tonnage output is relatively heavy. Last week it totaled an estimated 1,960,000 tons. While down substantially from the all-time record of 2,525,000 tons, recorded in the week ended Dec. 26, 1956, it is well over the 1947-49 average.

PRICES—Scrap quotations appear to be leveling out after a long decline. STEEL's composite on No. 1 heavy melting steel last week held unchanged at $33.17.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Nov. 24	Change	Same Week 1956	Same Week 1955
Pittsburgh	78	— 1*	96	103.5
Chicago	78	— 2*	100	98.5
Mid-Atlantic	82.5	— 0.5	102	98
Youngstown	70	+ 4	104	100
Wheeling	64	— 5	102.5	101
Cleveland	76.5	— 4.5*	104	100
Buffalo	83	— 2.5	107.5	105
Birmingham	60.5	0	95.5	94
New England	53	0	85	90
Cincinnati	86	+ 4.5*	96	92.5
St. Louis	89	— 0.5*	100	109.5
Detroit	93	0*	101	95
Western	86	0	107	99
National Rate	76.5	— 1	100.5	99

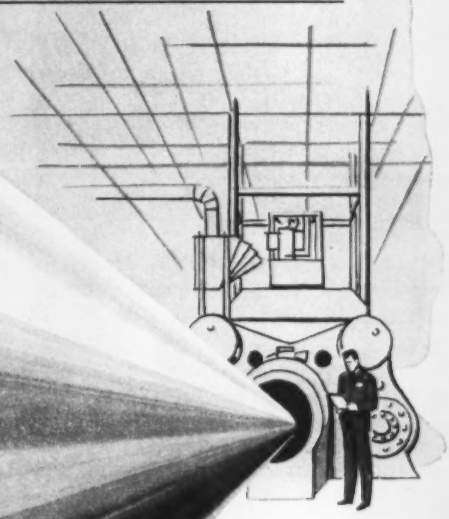
INGOT PRODUCTION‡

	Week Ended Nov. 24	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	122.3†	123.9	127.7	153.3
NET TONS (In thousands)	1,965	1,990	2,052	2,463

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—Page 53 Technical Outlook—Page 91

FOR YEARS OF PIPE ECONOMY...



THIS EXTRUDED HEAVY WALL

PROTECTS

against severest heat, pressure and corrosion

Here is High Integrity pipe for the toughest applications in the power, petroleum, chemical and other industries. Extruded from any ferrous alloy in lengths up to 50 feet or more, and with virtually any wall thickness, this pipe from the Curtiss-Wright Metals Processing Division provides increased on-the-job life, long-term economy, elimination of down time – not just for months, but for years to come. Extruded to specification under tremendous one-push pressures from the Division's giant 12,000-ton horizontal steel extrusion press, Curtiss-Wright Heavy Wall Pipe is of uniform high strength and has high resistance to pressure, heat and corrosion. Write today for information on both your standard and special requirements.

80 Grider Street

METALS PROCESSING DIVISION

CURTISS-WRIGHT CW

CORPORATION • BUFFALO, N. Y.

OFFICES IN: NEW YORK • CHICAGO • LOS ANGELES • DAYTON • MONTREAL

Steel Mill Shipments—1st Nine Months, 1957

MARKET GROUPS

	Net Tons	Per Cent of Total Shipments
Warehouses	11,708,222	18.71
Automotive	10,392,996	16.60
Construction	9,637,526	15.40
Containers	5,183,132	8.28
Export	3,608,021	5.76
Machinery	3,603,619	5.76
Rail Transportation	3,428,045	5.48
Converters	2,802,466	4.48
Contractors' Products	2,687,941	4.29
Electrical Machinery	1,627,072	2.60
Domestic, Commercial Equip.	1,424,415	2.28
Appliances, Utensils, Cutlery	1,146,245	1.83
Shipbuilding	931,668	1.49
Fasteners	864,883	1.38
Forgings	848,455	1.36
Agricultural	809,366	1.29
Unclassified	652,690	1.04
Oil & Gas Drilling	581,267	0.93
Ordnance & Other Military	300,202	0.48
Mining, Quarrying, Lumbering	265,863	0.42
Aircraft	85,234	0.14
Total	62,589,328	100.00

PRODUCTS

	Net Tons	Per Cent of Total Shipments
Cold-Rolled Sheets	8,797,576	14.06
Plates	7,386,348	11.80
Hot-Rolled Sheets	6,042,697	9.65
Hot-Rolled Bars	5,956,626	9.52
Structural Shapes	5,166,376	8.25
Electrolytic Tin Plate	3,911,688	6.25
Line Pipe	3,262,249	5.21
Semifinished	3,229,699	5.16
Oil Country Tubular Goods	2,268,209	3.62
Standard Pipe	2,126,811	3.40
Drawn Wire	2,026,912	3.24
Rails & Accessories	1,889,282	3.02
Reinforcing Bars	1,882,195	3.01
Galvanized Sheets	1,830,016	2.92
Hot-Rolled Strip	1,072,636	1.71
Cold-Finished Bars	1,030,314	1.65
Cold-Rolled Strip	906,117	1.45
Mechanical Tubing	616,727	0.99
Electrical Sheets & Strip	491,258	0.79
Steel Piling	443,211	0.71
Pressure Tubing	327,101	0.52
Tool Steel	77,511	0.12
All Other	1,847,769	2.95
Total	62,589,328	100.00

Source: American Iron & Steel Institute.

Construction Is a Good Steel Customer

It takes up a lot of slack caused by the decline in buying by the automobile industry and places mill shipments of plates and structurals high on the list

THE construction industry took up much of the slack in steel buying in the first three quarters of this year.

Ordinarily, the automobile industry orders more steel than any other consumer—twice as much as the construction industry. In the first nine months of this year, the pattern changed. Mill shipments of finished steel to the auto industry came to 10,392,996 net tons, but the construction industry took 9,637,526 tons, a record for the nine-month period. In fact, the construction industry has seldom used that much steel in previous 12-month periods.

Adds Up—If you add the shipments of steel for use as contractors' products (2,687,941 tons), the tonnage going to construction exceeded that which went to the auto industry. Both industries also obtain steel from warehouses.

The construction industry's heavy consumption of steel this year is reflected in the forms of material shipped. Plates and structurals were high on the list, with plates being second only to cold-rolled sheets. Mill shipments of heavy structural shapes, steel piling, and line pipe, set records in the first nine months of 1957.

More Records—Shipments of oil country tubular goods (2,268,209 net tons) set a record for the first nine months. So did shipments of electrolytic tin plate (3,911,688 net tons).

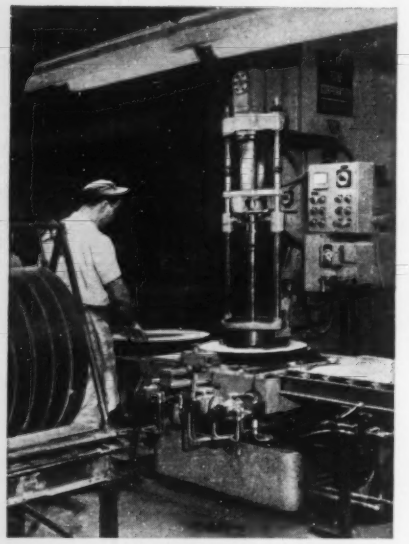
Exports of steel from the mills are running higher than they have for a decade. In the first nine months of 1957, they totaled 3,608,021 net tons, exceeding annual exports from the mills for any year between 1947 and 1956. Exports in 1947 were 4,206,692 tons. In 1956, they totaled 3,622,427 tons.

Tonnagewise, the most impor-

Why MICROHONING

Lowers Costs, Increases Production, Improves Quality of Grinding Wheels

Bay State Abrasive Products Company, one of the largest and most progressive manufacturers of abrasive products, Microhones the arbor hole of their snagging wheels to secure improved wheel performance, reduce manual handling, lower processing costs and increase production.



Why Microhoning Saves Time, Energy and Reduces Processing Costs of Arbor Holes over 50%:

1. **Less Equipment**—one Microhoning machine does work of two grinders.
2. **Less Operating Costs**—Microhoning processes 450 to 600 grinding wheels per set of abrasive sticks; abrasives cost was substantially higher with former grinding method.
3. **Less Maintenance**—Hydrohoner has no chucks to maintain and there is now only one machine instead of two.
4. **Less Gaging**—Microhoning *automatically* brings arbor hole to size within .003" tolerance; former grinding method required repeated gaging during operation.

Why Microhoning Improves Performance of Grinding Wheels:

1. **Better Fit**—inherent qualities of the Microhoning process are geometric accuracy and ability to hold close tolerances . . . rounder and accurately sized arbor holes assure a better fit.
2. **Less Arbor Wear**—Microhoning cuts both abrasive grain and resinoid bond while producing a smoother hole.
3. **Less Chatter**—Microhoning assures arbor holes that are square with faces and more concentric with O.D.

See page to right for "How Microhoning" accomplishes the above results.

The principles and application of Microhoning are explained in a 30-minute, 16mm, sound movie, "Progress in Precision" . . . available at your request.

☐ Please send me "Progress in Precision" in time for showing on_____(date).
☐ Please have a Micromatic Field Engineer call.
☐ Please send Microhoning literature and case histories.

NAME_____

TITLE_____

COMPANY_____

STREET_____

CITY_____ ZONE_____ STATE_____

MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

tant group of steel products being exported is pipe and tubing. Other groups ranking high are sheets and strip, shapes and plates, and semifinished.

Tubular Goods . . .

Tubular Goods Prices, Page 145

Demand for a wide variety of tubular products, ranging from oil country tubing to buttweld pipe, continues to decline. Sales are off seasonally with the decline in building activity.

Specialty tubular products are less active. Mechanical tubing is moving slowly from warehouses. Miscellaneous small consumers are not showing much interest in covering their needs. Automotive requirements are low but steady. Some increase in auto business may develop within the next couple months.

Plates . . .

Plate Prices, Page 139

Heavy gage plate supplies are still on the tight side. Otherwise, though, other sizes and descriptions appear in ample supply. Universal plates and strip plate tonnages are more than ample for current demands.

There is little forward buying being done, even of the scarce heavy gage plate. Most producers of sheared plate, though, will be able to maintain active operations throughout the remainder of this year and well into next year.

One of the major producers at Pittsburgh has a full order book for heavy plates through December and is now taking orders for first quarter shipment. Railroad and construction needs are off noticeably in the area, but over-all demand is holding up fairly well.

The Commerce Oil Co. refinery at Jamestown, R. I., will require 12,000 tons of plates, including tonnage for 3-million gallon storage facilities.

Tank shop backlogs are slightly lower in New England, and orders for light gage plates in the area are developing slowly. Most shops are operating on inventory. Ship plate volume is heavier for the first quarter, but bridge plate girder and weldment tonnage is down.

Indications are that plate pro-

duction this year will be about 23 per cent heavier than it was in 1956.

The largest plate order of its type booked this year includes 127 glass-lined brewery tanks. Pfaudler Co., Rochester, N. Y., will build them for Anheuser-Busch Inc., Tampa, Fla. Several hundred tons of plates will be required.

It was reported last week that St. Lawrence Steel Corp. will begin production of heavy and medium gage steel plates by the third quarter of next year. The company, formed last spring, is understood to have purchased the government armor plate plant at Gary, Ind. At full production, capacity would be around 600,000 tons of plates for shipbuilders, pipe fabricators, machine tool builders and road builders.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 140 & 141

Sheet steel is now moving a little more actively, particularly on automotive account, but volume still falls short of sellers' expectations.

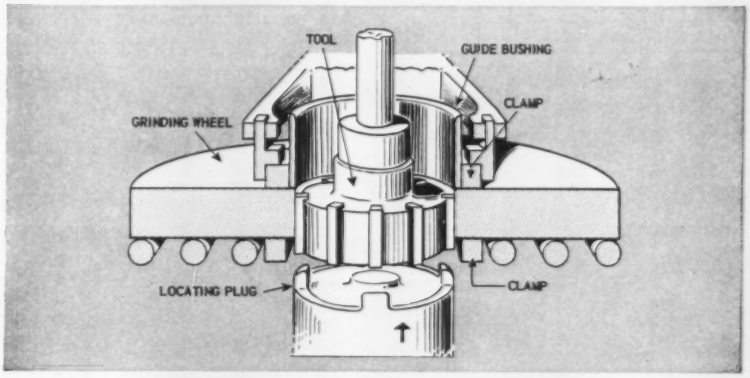
Pittsburgh mills say automakers are using more sheets than they are buying; that their purchases do not reflect the potential strength of the market. They say production will likely remain at present levels until first quarter.

In the Cleveland market, sellers report more automotive buying for January delivery. This represents a shift from the hand-to-mouth ordering prevalent for several months. A district producer of hot and cold rolled sheets, strip, alloy and stainless bars, shipped almost as much tonnage to auto builders in October as it did in July and August combined. Its October total was 60 per cent of its combined July - August - September bookings. A slight increase in volume the last two months of the year is anticipated.

A Detroit area mill expects auto orders through January will be 30 per cent higher than in the third quarter. Rush auto orders continue, but these appear to be slowing down. This is taken to indicate that the automakers are starting to build slightly larger inventories than the two-week lots they have been averaging. Auto purchasing agents expect to place

How MICROHONING
Lowers Costs, Increases Production, Improves Quality of Grinding Wheels

By changing from grinding to Microhoning of arbor holes, Bay State Abrasive Products Company has realized substantially lower processing costs, raised productivity and improved the performance qualities of their snagging wheels.



Here's How Microhoning Now Saves Time, Labor, Material and Processing Costs:

1. Snagging wheels now travel from facing machine to Hydrohoner on a conveyor—there is no manual lifting or handling.
2. A disappearing plug automatically locates wheels in Hydrohoner where they are clamped on the faces and remain stationary during Microhoning operation—there is no manual placing of wheels on chucks, or chucks to maintain.
3. One Hydrohoner does work of two grinders; and one set of Bay State iron bonded, diamond sticks Microhones from 450 to 600 resinoid-bonded wheels—less equipment to maintain and lower costs for abrasive.
4. In approximately a minute, Microhoning removes from .030" to .070" of stock from arbor holes ranging in diameter from 6" to 12"—processing is faster and material is saved because wheels can now be molded closer to final size.
5. Microhoning tool automatically holds diametric accuracy within .003" tolerance—repeated manual gaging is eliminated.

See page to left for "Why Microhoning" provides cost-and-time-saving benefits.

Send Coupon for Complete Information

Learn how Microhoning will give efficient stock removal, closer tolerances, accurate alignment and functional surfaces.

☐ Please have a Micromatic Field Engineer call.
☐ Please send Micromatic literature and case histories.

NAME_____H
TITLE_____
COMPANY_____
STREET_____
CITY_____ ZONE_____ STATE_____

MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

heavier orders for sheets and strip for the first quarter.

Appliance manufacturers, particularly refrigeration and laundry equipment, have placed orders for cold rolled sheets and strip to be delivered in December and January. The tonnage is up 10 to 15 per cent. These buyers plan to boost production in first quarter to fill pipelines which otherwise would be empty by the end of March.

The Navy Purchasing Office, Washington, closes Dec. 5 on 200 tanks, 500 gallons each.

Wire . . .

Wire Prices, Pages 141 & 142

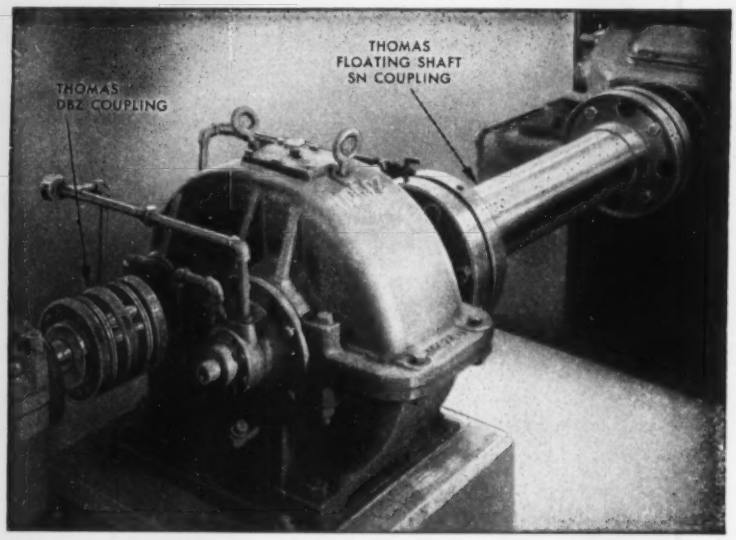
While some first quarter orders are being placed for carbon wire, November-December volume shows no increase in New England. Consumers are placing small orders for prompt shipment. Producers in most cases can get out spot tonnage well under normal leadtime.

Demand on automotive account is slightly heavier, and some first quarter bookings are reported. This has enabled an eastern wiremaker to continue operation of one additional open hearth. Over-all, carbon wire finishing operations are around 60 to 65 per cent of capacity in New England. At this rate, substantial inventories of rods are being worked off slowly.

Improved buying by automakers has raised manufacturers wire sales to levels above the low point of the third quarter. November demand may surpass that of October, and October was well above that of August. The outlook is for sales to hold present levels through December.

THOMAS FLEXIBLE COUPLINGS

Give You Freedom From Coupling Maintenance



NO LUBRICATION **NO MAINTENANCE** **NO WEARING PARTS**

Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running.

They will protect your equipment and extend the life of your machines.

Properly installed and operated within rated conditions, Thomas Couplings should last a lifetime.

Under Load and Misalignment only Thomas Flexible Couplings offer all these advantages:

1 Freedom from Backlash Torsional Rigidity
2 Free End Float
3 Smooth Continuous Drive with Constant Rotational Velocity
4 Visual Inspection While in Operation
5 Original Balance for Life
6 No Lubrication
7 No Wearing Parts
8 No Maintenance

Write for Engineering Catalog 51A

THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.

Steel Bars . . .

Bar Prices, Page 139

Hot-rolled carbon bars are available for shipment from the mills in one to four weeks, depending on rolling cycles. By shopping around, consumers usually wind up with an early shipment. A Cleveland seller says metalworking shops can place small lots for shipment within a few days.

Buying is retarded to some extent by yearend inventory controls. New England users, for instance, are holding down stocks for tax purposes, buying only for fill-in and emergency needs through December.

Automotive suppliers, including forge shops, lack firm orders in volume to warrant anticipatory buying. Pittsburgh sellers expect no marked pickup in sales, including automotive, until January.

Scattered improvement in sales of cold drawn bars is reported. Cold-finished operations in the East average 60 -65 per cent.

German bars and billets are reported being shipped into Cuba and South America at prices 33 per cent under those quoted by U. S. sellers.

Carpenter Steel Co., Reading, Pa., will operate the former Northeastern Steel Co. plant at Bridgeport, Conn. The mill has been operating spasmodically with one electric furnace.

Size extras on various sizes of rounds, squares, and round corner squares have been revised upward by Republic Steel Corp. Increases, ranging from 30 to 40 cents per 100 lb, apply on both merchant quality and special quality bars. Effective Nov. 20, they supersede extras posted Jan. 25, this year.

Warehouse . . .

Warehouse Prices, Page 146

Volume of business booked by distributors continues to decline. Bookings this month are expected to fall below those of October. The trend undoubtedly will continue downward next month when holiday and inventory-taking periods will adversely affect business. Most steel users are confident they will be able to get material when needed and are keeping inventories low.

Distributors have been increasing their stocks of plates and structurals and now can furnish prompt delivery on practically all sizes. The possible exception is heavy plates.

Most warehouses have sharply curtailed their buying from mills for delivery in the fourth quarter and are filling orders from their substantial inventories. In many instances, this tonnage will not be replaced until the first quarter.

The warehouse pricing situation in the Los Angeles district is the weakest it has been in some time. Unless demand increases and inventories decline, some severe price cutting may develop soon.

Semifinished Steel . . .

Semifinished Prices, Page 139

Steel consumpion in 1958 will approach this year's volume but inventory reduction during the year will hold production at a level at least 5 per cent below that of 1957, B. F. Estes, director, staff administration, U. S. Steel Corp., Pittsburgh, said last week. He thinks steel output next year will total about 115 million net tons.

Three open hearth furnaces at the former Northeastern Steel plant, Bridgeport, Conn., will be dismantled by the new owner, Carpenter Steel Co. of New England Inc., subsidiary of the Reading, Pa., producer. Furnaces with 188,280 tons of capacity have not been operating for nearly a year. The plant's pig iron inventory was sold several months ago. Carpenter will operate two electric furnaces with annual capacity of 115,000 tons.

Republic Steel Corp., Cleveland, hiked the restricted chemical extra for manganese on semifinished carbon steel, forging quality. The new extra (effective Nov. 20) for narrowest acceptable restricted range up to 1.60 per cent maximum is $5. It supersedes the $2 extra in effect since Jan. 25.

Structural Shapes . . .

Structural Shape Prices, Page 139

Supplies of structural shapes in all sizes and varieties now are fairly close to being in balance with demand. Included are wide flange sections, though one large producer in the East is still running behind on commitments.

Structural business continues to taper, and competition is increasingly sharp for the new work coming out. Fabricators' order backlogs are slipping steadily, but virtually all shops are still well occupied. Public work accounts for a large portion of current demand. This includes highway and bridge needs. Schools are calling for a substantial tonnage of light sections.

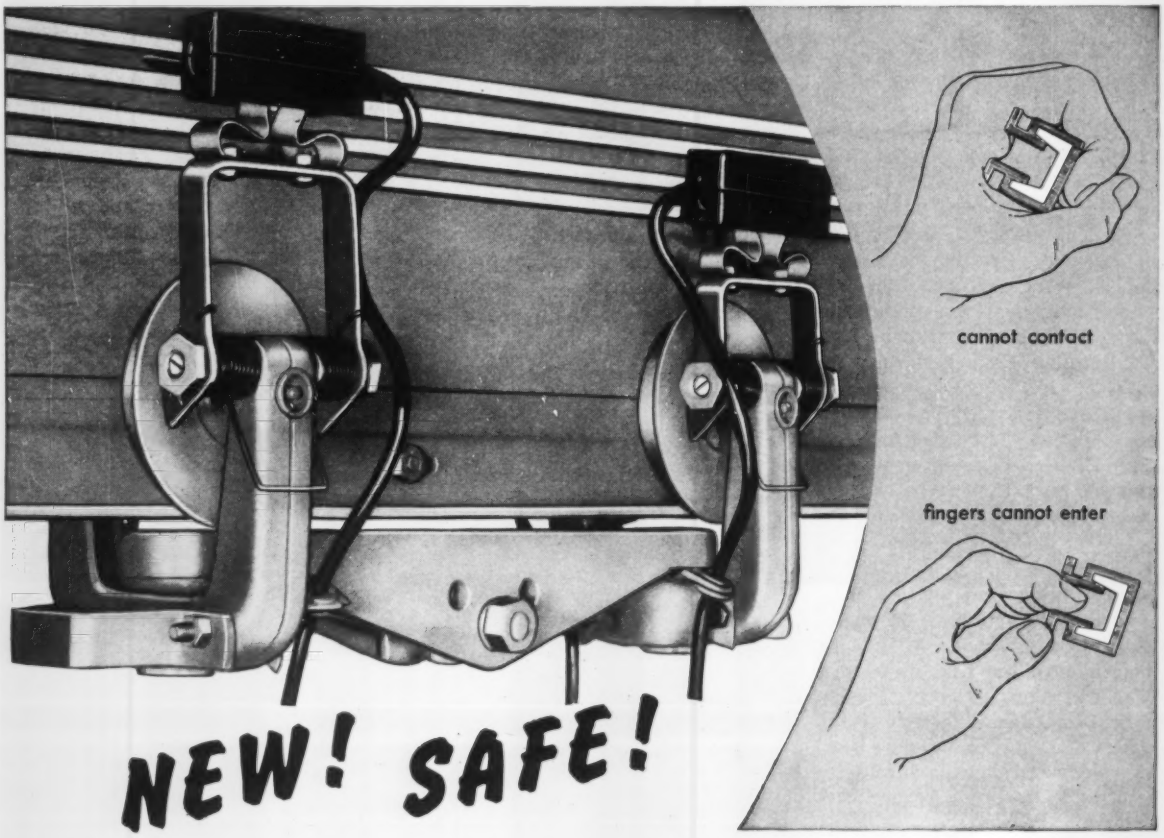
As the supply of heavy structurals improves, demand continues to ease off in New England. The

ERIE **Bolts • Studs • Cap Screws • Nuts**
In Alloys • Stainless • Carbon • Bronze

Only the hands of the specialist can produce fasteners which will meet your design and engineering specifications with precise accuracy. Erie has been doing just that for more than 40 years . . . producing to customer specifications bolts, studs, cap screws and nuts for use in extreme temperature, corrosion and tensile applications for a wide diversity of industries. Submit your specifications to us with confidence.

Subsidiary of
REPUBLIC INDUSTRIAL CORPORATION

ERIE BOLT & NUT CO.
Erie, Pennsylvania
Representatives in Principal Cities



NEW! SAFE!

AMERICAN MONORAIL

KANT SHOCK

SHIELDED ELECTRIFICATION

For Monorail Track and Crane Systems

By covering its standard bus bar electrification with a specially designed polyvinyl chloride extrusion, American MonoRail now furnishes completely safe electrified systems.

This KANT-SHOCK shielding absolutely prevents accidental contact with live bus bars. It is impossible for an adult's finger to enter the shield.

A new type sliding shoe collector provides a floating contact throughout a monorail system regardless of any misalignment due to bent bars or at switch and inter-lock connections.

KANT-SHOCK Electrification positively eliminates all the hazards of open bar conductors — prevents costly accidents — protects employees — reduces insurance rates.

Write for KANT-SHOCK Bulletin KS-1

Member of Materials Handling Institute and Monorail Manufacturers Association

For Power Driven Conveyors, Use Landahl Chainless Conveyors

AMERICAN MONORAIL COMPANY

13102 ATHENS AVENUE, CLEVELAND 7, OHIO (IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.)

bulk of wide flange sections in that area is for bridges, and new tonnage being estimated is at the lowest point this year. Standard structural deliveries have improved to three or four weeks.

The St. Lawrence Seaway and preparations at Great Lakes ports to accommodate European ocean vessels when the seaway opens are keeping the demand for sheet piling high, it was reported by Cleveland sellers last week.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 139

Slackening demand for reinforcing bars stems largely from a decline in bridge and highway requirements. For buildings, notably schools, the drop in buying is less apparent. Most commercial structures designed for reinforced concrete construction during the period of structural steel shortage are expected to go ahead unchanged.

Among steel products used in federal highway construction, prices for reinforcing steel are off 1.8 per cent from those prevailing in the first six months of this year.

Demand for welded highway mesh is falling substantially under earlier estimates. Capacity for making this product is considerably above that of last year.

Iron Ore . . .

Iron Ore Prices, Page 147

Shipments of Lake Superior iron ore in the week ended Nov. 18 totaled 1,137,142 gross tons, reports the American Iron Ore Association. This compares with 1,875,675 tons in the like week last year.

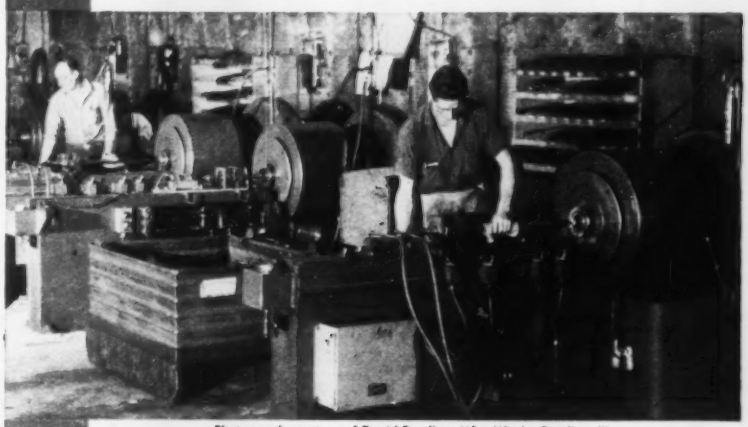
Cumulative shipments in the 1957 Great Lakes navigation season to Nov. 18 were 83,947,012 tons, up 10,940,911 tons from the 73,006,101 tons moved to the like date in the 1956 season.

As of Nov. 15, 132 lake ore carriers were in commission, equal to 53 per cent of the total fleet, with carrying capacity of 1,576,550 tons. Operating on Oct. 15 were 235 vessels, 94 per cent of capacity. A year ago, 255 vessels, 100 per cent of fleet capacity, were in commission.

The 1957 lake ore shipping season is rapidly coming to a close.

ETNA

SWAGING MACHINES



Photograph courtesy of David Bradley Mfg. Works, Bradley, Ill.

For more than 50 years, Abbey Etna has been a recognized leader in designing and building rotary swaging machines and automatic feeding devices.

Abbey Etna offers a complete range of machine sizes and capacities for tapering, sizing, reducing or forming special shapes in round solids or tubing.

Swaging has many advantages over other methods of performing these operations since it is *chipless* machining . . . from needle points to 500-pound bomb noses and tails.

TUBE MILLS · TUBE CUTOFF MACHINES · TUBE HANDLING EQUIPMENT · END FACING MACHINES · ALLIED EQUIPMENT

Abbey ETNA MACHINE CO.

811 EAST INDIANA AVENUE · PERRYSBURG, OHIO

Steel Ingot Production—October, 1957

Period	— OPEN HEARTH — Net tons	Per cent of capacity	—BESSEMER— Net tons	Per cent of capacity	—ELECTRIC— Net tons	Per cent of capacity	——TOTAL—— Net tons	Per cent of capacity
1957								
January ..	9,829,691	99.0	294,839	77.1	884,232	86.5	11,008,762	97.1
February .	8,898,671	99.2	277,682	80.4	810,853	87.8	9,987,206	97.6
March	9,442,164	95.1	275,156	71.9	871,754	85.2	10,589,074	93.4
1st Qtr. ..	28,170,526	97.7	847,677	76.3	2,566,839	86.4	31,585,042	96.0
April	8,820,328	91.8	231,731	62.6	762,721	77.1	9,814,780	89.5
May	8,842,707	89.1	201,864	52.8	747,752	73.1	9,792,323	86.4
June	8,498,903	88.4	210,915	57.0	681,584	68.9	9,391,402	85.6
2nd Qtr. ..	26,161,938	89.8	644,510	57.4	2,192,057	73.0	28,998,505	87.2
1st 6 Mo..	54,332,464	93.7	1,492,187	66.8	4,758,896	79.7	60,583,547	91.5
July	8,086,519	81.4	194,638	50.9	627,575	61.4	8,908,732	78.6
August ...	8,297,172	83.6	204,723	53.5	731,995	71.6	9,233,890	81.5
*September.	8,135,139	84.7	185,967	50.2	656,800	66.4	8,977,906	81.8
*3rd Qtr...	24,518,830	83.2	585,328	51.5	2,016,370	66.4	27,120,528	80.6
*9 Mo. ..	78,851,294	90.2	2,077,515	61.7	6,775,266	75.2	87,704,075	87.9
†October ..	8,349,000	84.1	155,000	40.5	691,000	67.6	9,195,000	81.1
1956								
January ..	9,676,151	101.4	323,235	79.5	828,845	86.7	10,828,231	99.3
February .	9,043,064	101.3	296,543	78.0	799,388	87.1	10,118,995	99.2
March	9,795,263	102.7	310,060	76.3	819,465	85.7	10,924,788	100.2
1st Qtr. ..	28,514,478	101.8	929,838	77.9	2,427,698	86.5	31,872,014	99.6
April	9,437,945	102.2	306,388	77.9	779,452	84.2	10,523,785	99.7
May	9,370,167	98.2	297,990	73.3	822,219	86.0	10,490,376	96.2
June	8,664,605	93.9	282,846	71.9	773,546	83.6	9,720,997	92.1
2nd Qtr. ..	27,472,717	98.1	887,224	74.3	2,375,217	84.6	30,735,158	96.0
1st 6 Mo. .	55,987,195	100.0	1,817,062	76.1	4,802,915	85.6	62,607,172	97.8
July	1,330,151	13.9	.....	....	292,012	30.5	1,622,163	14.9
August ...	7,213,274	75.6	189,564	46.6	719,759	75.3	8,122,597	74.5
September..	9,342,796	101.2	286,978	72.9	792,885	85.7	10,422,659	98.8
3rd Qtr. ..	17,886,221	63.2	476,542	39.5	1,804,656	63.6	20,167,419	62.3
9 Mo.	73,873,416	87.6	2,293,604	63.8	6,607,571	78.2	82,774,591	85.9
October ...	9,841,002	103.2	330,101	81.2	877,410	91.8	11,048,513	101.3
November..	9,430,248	102.2	295,827	75.2	829,425	89.6	10,555,500	100.0
December .	9,695,919	101.6	308,465	75.9	833,161	87.1	10,837,545	99.4
4th Qtr. ..	28,967,169	102.3	934,393	77.4	2,539,996	89.5	32,441,558	100.3
2nd 6 Mo..	46,853,390	82.8	1,410,935	58.5	4,344,652	76.5	52,608,977	81.3
Total 1956	102,840,585	91.6	3,227,997	67.4	9,147,567	81.2	115,216,149	89.8

Note—The percentages of capacity operated in 1957 are calculated on Jan. 1, 1957, annual capacities of: Open hearth, 116,912,410 net tons; bessemer, 4,505,000 net tons; electric, 12,041,740 net tons; total, 133,459,150 net tons. The percentages of capacity operated in 1956 are calculated on Jan. 1, 1956, annual capacities of: Open hearth, 112,317,040 net tons; bessemer, 4,787,000 net tons; electric, 11,259,050 net tons; total, 128,363,090 net tons.
*Revised. †Preliminary figures, subject to revision.

Imported Steel delivered on Domestic Terms

No red tape! We deliver to any place in North America. Over 10 years of service to more than 2000 North American accounts—as a domestic firm, on domestic terms—with lower costs or better deliveries. Write for "How to be at home with products made abroad" and the address of your local Kurt Orban Company representative.

Prices per 100 lbs. (except where otherwise noted) landed, including customs duty, but no other taxes.

	Atlantic & Gulf Coast	West Coast	Vancouver	Montreal
Deformed Bars (⅜" Dia. incl. all extras)	$6.52	$6.77	$6.64	$6.25
Merchant Bars (¼" Round incl. all extras) ..	7.62	7.85	7.48	7.22
Bands (1"x¼"x20' incl. all extras)	7.76	7.98	7.65	7.38
Angles (2"x2"x¼" incl. all extras)	6.57	6.75	6.99	6.69
Beams & Channels (base)	6.82	7.00	7.24	6.94
Furring Channels (C.R. ¾", per 1000')	26.62	27.77	....	....
Barbed Wire (per 82 lb. net reel)	6.95	7.40	7.75	7.80
Nails (bright, common, 20d and heavier)	8.38	8.58	9.07	8.99
Larssen Sheet Piling (section II, new, incl. size extra)	7.80	8.10	8.10	7.80
Wire, Manufacturer's bright, low C, (11½ ga.)	7.15	7.29	8.29	8.29
Wire, galv., Fence qual., low C, (11½ ga.) ..	7.68	7.82	9.09	9.09
Wire, Merchant quality, bl. ann., (10 ga.) ...	7.27	7.42	8.45	8.45
Rope Wire (.045", 247,000 PSI, incl. extras)..	13.60	13.75	13.00	13.00
Wire, fine and weaving, low C, (20 ga.)	10.66	10.80	10.17	12.17
Tie Wire, autom. baler (14½ ASWG, 97 lbs. net)	9.58	9.73	9.64	9.54
Merchant Pipe (½" galv. T & C. per 100')...	8.48	8.83	....	....
Casing (5½", 15.5 J55, T & C. per 100')	189.00	194.00	....	....
Tubing (2⅞", 6.4 J55, EUE, per 100')	98.00	99.00	....	....
Forged R Turn. Bars, C-1035 (from 10" di.).	13.50	13.73	13.50	13.24

Ask prices on: Bulb tees, bolts and nuts, manganese steel plates and shapes, welded wire reinforcing mesh and hardware cloth, boiler tubes, A-335-P11 pressure pipe.

from prominent century-old West German Mills

Through Stahlunion-Export GmbH

BOCHUMER VEREIN World's first Steel Foundry, 1842—Vacuum degassed Forgings. Pinion wire and spring wire for watches and clocks.
DORTMUNDER UNION Originators of Interlock Sheet Piling—Larssen Sheet Piling, Plate, Shapes, Forged Bars and Shafts.
NIEDERRHEIN Europe's most modern Rod Mill—OH, CH, Low Metalloid, Specialty Wire Rod, Merchant Bars.
WESTFAELISCHE UNION Europe's largest Wire Mill—All types drawn Wire and Wire Products—Nails, Barbwire, Wire Rope, Prestress Concrete Wire and Strand.
PHOENIX RHEINROHR Europe's largest Pipe Mill—Pipe, Tubing, Flanges, Welding Fittings, Precision Tubes, Tubular Masts.

Ask us to quote on your requirements

KURT ORBAN COMPANY, INC., 46 Exchange Place, Jersey City 2, N. J.
In Canada: Kurt Orban Canada, Ltd., Vancouver, Toronto, Montreal

Pittsburgh Steamship Div., U. S. Steel Corp., last week announced it had laid up 11 more vessels, bringing the number of company ore carriers idled for winter so far to 30. The Pittsburgh fleet totals 57.

Pig Iron . . .

Pig Iron Prices, Page 146

Demand for merchant pig iron is slow. Foundries are operating less than four days a week in many districts and anticipate no substantial pickup until the first quarter of next year.

They are not getting a sustained flow of orders and, therefore, are buying their raw materials only as needed. It is generally conceded any real improvement in demand for castings would be accompanied by an immediate pickup in iron demand because inventories are low.

The lull in pig iron buying interest is reflected in the curtailment of blast furnace operations. Republic Steel Corp. banked the No. 5 furnace at Cleveland on Nov. 17. The stack will remain idle until demand for iron picks up. Only three of the plant's six furnaces are in production.

Two blast furnaces out of 16 in the Buffalo district remain idle. They are down for relining jobs which will not be rushed as similar work was a year ago when demand was much heavier.

Metallurgical Coke . . .

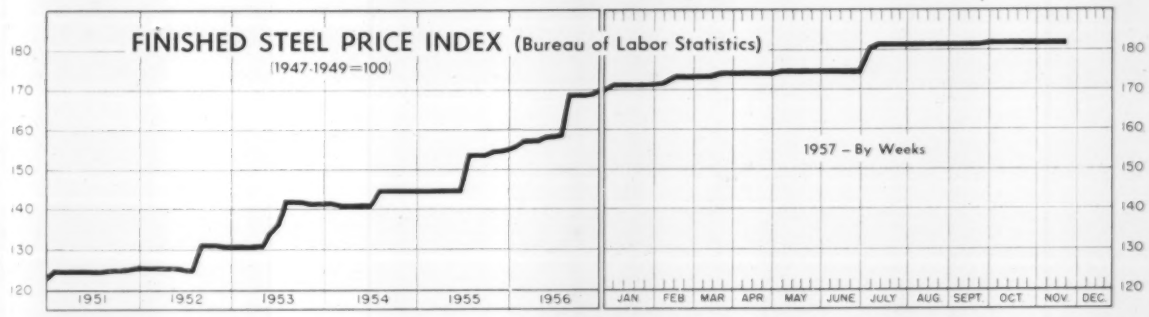
Metallurgical Coke Prices, Page 147

Coke production totaled 6,296,653 net tons in September, reports the U. S. Bureau of Mines. Of this, 6,160,642 tons were oven coke, and 136,011 tons, beehive. In August, output was 6,518,060 tons (6,369,395 oven and 148,665 beehive). Production in September, 1956, amounted to 6,454,600 tons (6,303,000 oven and 151,600 beehive).

Cumulative output through September this year was 58,713,738 tons (56,975, 596 oven and 1,738,142 beehive). This compares with 54,324,600 tons (52,479,200 oven and 1,845,400 beehive) in the like period last year.

Producers' stocks at the end of September were 2,599,551 tons, equal to 12.7 days' production. This compares with 2,544,906 tons (12.4 days) at the end of September a year ago.

Price Indexes and Composites



Nov. 19, 1957	Week Ago	Month Ago	Oct. Avg.	Year Ago
181.7	181.7	181.7	181.7	168.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 19

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.600	Bars, Reinforcing	6.210
Rails, Light, 40 lb	7.067	Bars, C.F., Carbon	10.360
Tie Plates	6.600	Bars, C.F., Alloy	13.875
Axles, Railway	9.825	Bars, C.F., Stainless, 302 (lb)	0.553
Wheels, Freight Car, 33 in. (per wheel)	60.000	Sheets, H.R., Carbon	6.192
Plates, Carbon	6.150	Sheets, C.R., Carbon	7.089
Structural Shapes	5.942	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.535	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.650	Sheets, Electrical	12.025
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V2.1, Mo 5.5, C 0.60 (lb)	1.355	Strip, C.R., Carbon	9.243
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.850	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.525	Strip, H.R., Carbon	6.245
Bars, H.R., Stainless, 303 (lb)	0.525	Pipe, Black, Buttweld (100 ft)	19.814
Bars, H.R., Carbon	6.425	Pipe, Galv., Buttweld (100 ft)	23.264
		Pipe, Line (100 ft)	199.023
		Casing, Oil Well, Carbon (100 ft)	194.499
		Casing, Oil Well, Alloy (100 ft)	304.610
		Tubes, Boiler (100 ft)	49.130
		Tubing, Mechanical, Carbon (100 ft)	24.953
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
		Black Plate, Canmaking Quality (95 lb base box)	7.583
		Wire, Drawn, Carbon	10.225
		Wire, Drawn, Stainless, 430 (lb)	0.653
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 20 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	239.15	239.15	239.15	225.92	181.31
Index in cents per lb	6.479	6.479	6.479	6.111	4.912

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$146.03	$146.03	$146.03	$137.66	$110.98
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	62.63	55.04
Basic Pig Iron, GT	65.99	65.99	65.99	62.18	54.66
Malleable Pig Iron, GT	67.27	67.27	67.27	63.41	55.77
Steelmaking Scrap, GT	33.17	33.17	36.83	62.00	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 20 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld., Philadelphia	5.725	5.725	5.725	5.35	4.502
Bars, C.F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld., Philadelphia	5.545	5.545	5.545	5.40	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.10	5.10	5.10	5.25	4.35
Plates, Sparrows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.35
Sheets, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsburgh	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.75-4.225
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.25	7.25	7.25	6.95	5.30-6.05
Wire, Basic, Pittsburgh	7.65	7.65	7.65	7.20	5.10-5.225
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.20	6.20-6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.95	$8.95

*Including 0.35c for special quality.

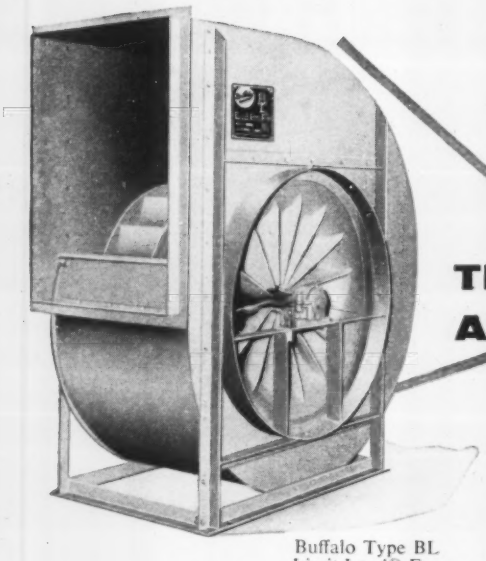
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, 7/32-5/8" Pitts.	6.15	6.15	6.15	5.80	4.425

PIG IRON, Gross Ton	Nov. 20 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$63.50	$55.50
Basic, Valley	66.00	66.00	66.00	62.50	54.50
Basic, deld., Phila.	70.01	70.01	70.01	66.26	59.25
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, deld., Phila.	70.51	70.51	70.51	66.76	59.75
No. 2 Fdry, Birm.	62.50	62.50	62.50	59.00	51.38
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	66.70	58.93
Malleable, Valley	66.50	66.50	66.50	63.00	55.00
Malleable, Chicago	66.50	66.50	66.50	63.00	55.00
Ferromanganese, Duquesne	245.00†	245.00†	245.00†	235.00†	228.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$33.50	$32.50	$37.50	$62.50	$44.00
No. 1 Heavy Melt, E. Pa.	33.50	34.50	38.00	59.00	41.50
No. 1 Heavy Melt, Chicago	32.50	32.50	35.00	64.50	42.50
No. 1 Heavy Melt, Valley	31.50	31.50	35.50	66.50	44.00
No. 1 Heavy Melt, Cleve.	28.50	28.50	32.50	65.00	43.00
No. 1 Heavy Melt, Buffalo	32.50	32.50	36.50	59.50	43.00
Rails, Rerolling, Chicago	48.50	46.50	52.50	87.50	52.50
No. 1 Cast, Chicago	35.50	35.50	35.50	50.50	50.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$14.50	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	17.50	17.00



Buffalo Type BL
Limit-Load® Fan

THE "INSTALL-IT AND-FORGET-IT-FAN"

FOR INDUSTRIAL AIR-MOVING

With the "Buffalo" Type "BL" Fan, you're assured of dependable, economical, long lasting air-moving service for **your** particular air conditioning, ventilating or other industrial application. Here's why:

LONG, TROUBLE-FREE LIFE: because "Buffalo" gives you heavy gauge construction, rigid bracing, oversize self-aligning bearings, and a wheel which is die stamped, riveted and welded.

FULL RATED DELIVERY ON THE JOB: is insured by the proven backward-curved blade wheel, die-formed fixed inlet vanes, and wheel-suited housing.

QUIET OPERATION: made possible by complete streamlining from inlet to outlet plus precision balance of the wheel.

EASY INSTALLATION: on sturdy base, due to ample inlet and outlet collars. Larger sizes have split housings for convenient handling during installations.

Every "Buffalo" Fan is test-run before it leaves our shop. This assures you of peak efficiency . . . smooth, quiet operation . . . and a long life of completely reliable service. Want Full Details on "Buffalo" Type "BL" Fans? Just write us, now, for Bulletin F-102.

. . . that is, forget your "Buffalo" Type "BL" Fan as far as any day-to-day attention is concerned. It'll do its superb job, month-after-month, year-after-year, with no servicing other than routine maintenance. You can rely on the famous "Buffalo" "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.

BUFFALO FORGE COMPANY
BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING

Steel Prices

Mill prices as reported to STEEL, Nov. 20, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 140; to footnotes, page 142.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$73.50

INGOTS, Alloy (NT)
Detroit S41 .....$77.00
Farrell, Pa. S3 .....77.00
Lowellville,O. S3 .....77.00
Midland,Pa. C18 .....77.00
Munhall,Pa. U5 .....77.00
Sharon,Pa. S3 .....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 .....$77.50
Bridgeport,Conn. N19 ..80.50
Buffalo R2 .....77.50
Clairton,Pa. U5 .....77.50
Ensley,Ala. T2 .....77.50
Fairfield,Ala. T2 .....77.50
Fontana,Calif. K1 .....88.00
Gary,Ind. U5 .....77.50
Johnstown,Pa. B2 .....77.50
Lackawanna,N.Y. B2...77.50
Munhall,Pa. U5 .....77.50
S.Chicago,Ill. R2, U5..77.50
S.Duquesne,Pa. U5 ...77.50
Sterling,Ill. N15 .....77.50
Youngstown R2 .....77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$96.00
Bridgeport,Conn. N19..101.00
Buffalo R2 .....96.00
Canton,O. R2 .....98.50
Clairton,Pa. U5 .....96.00
Conshohocken,Pa. A3.101.00
Ensley,Ala. T2 .....96.00
Fairfield,Ala. T2 .....96.00
Fontana,Calif. K1 ...105.50
Gary,Ind. U5 .....96.00
Geneva,Utah C11 .....96.00
Houston S5 .....101.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2...96.00
LosAngeles B3 .....105.50
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
Seattle B3 .....109.50
Sharon,Pa. S3 .....96.00
S.Chicago R2, U5, W14..96.00
S.Duquesne,Pa. U5 ...96.00
S.SanFrancisco B3 ...105.50
Warren,O. C17 .....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$114.00
Bridgeport,Conn. N19.114.00
Buffalo R2 .....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3..121.00
Detroit S41 .....114.00
Economy,Pa. B14 ....114.00
Farrell,Pa. S3 .....114.00
Fontana,Calif. K1 ....135.00
Gary,Ind. U5 .....114.00
Houston S5 .....119.00
Ind.Harbor, Ind. Y1 ..114.00
Johnstown,Pa. B2 ....114.00
Lackawanna,N.Y. B2.114.00
Los Angeles B3 .....134.00
Lowellville,O. S3 ....114.00
Massillon,O. R2 ....114.00
Midland,Pa. C18 .....114.00
Munhall,Pa. U5 .....114.00
Sharon,Pa. S3 .....114.00
S.Chicago R2, U5, W14.114.00
S.Duquesne,Pa. U5 ...114.00
Struthers,O. Y1 .....114.00
Warren,O. C17 .....114.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. N19 $122.50
Buffalo R2 .....117.50
Canton,O. R2 .....120.00
Cleveland R2 .....117.50
Gary,Ind. U5 .....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ...117.50
Warren,O. C17 .....117.50

SKELP
Aliquippa,Pa. J5 .....5.075
Munhall,Pa. U5 .....4.875
Warren,O. R2 .....4.875
Youngstown R2, U5 ..4.875

WIRE RODS
AlabamaCity,Ala. R2 ..6.15
Aliquippa,Pa. J5 .....6.15
Alton,Ill. L1 .....6.35
Buffalo W12 .....6.15
Cleveland A7 .....6.15
Donora,Pa. A7 .....6.15
Fairfield,Ala. T2 .....6.15
Houston S5 .....6.40
IndianaHarbor,Ind. Y1..6.15
Johnstown,Pa. B2 .....6.15
Joliet,Ill. A7 .....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 .....6.25
LosAngeles B3 .....6.95
Minnequa,Colo. C10 ....6.40
Monessen,Pa. P17 .....6.15
N.Tonawanda,N.Y. B11.6.15
Pittsburg,Calif. C11 ....6.95
Portsmouth,O. P12 ....6.15
Roebling,N.J. R5 .....6.25
S.Chicago,Ill. R2 .....6.15
SparrowsPoint,Md. B2 ..6.25
Sterling,Ill. (1) N15 ....6.15
Sterling,Ill. N15 .....6.25
Struthers,O. Y1 .....6.15
Worcester,Mass. A7 ....6.45

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 ....5.275
Atlanta A11 .....5.475
Aliquippa,Pa. J5 .....5.275
Bessemer,Ala. T2 .....5.275
Bethlehem,Pa. B2 ....5.325
Birmingham C15 .....5.275
Clairton,Pa. U5 .....5.275
Fairfield,Ala. T2 .....5.275
Fontana,Calif. K1 ....6.075
Gary,Ind. U5 .....5.275
Geneva,Utah C11 .....5.275
Houston S5 .....5.375
Ind.Harbor,Ind. I-2 ...5.275
Johnstown,Pa. B2 .....5.325
Joliet,Ill. P22 .....5.275
KansasCity,Mo. S5 ....5.375
Lackawanna,N.Y. B2..5.325
LosAngeles B3 .....5.975
Minnequa,Colo. C10 ...5.575
Munhall,Pa. U5 .....5.275
Niles,Calif. P1 .....5.925
Phoenixville,Pa. P4 ...5.325
Portland,Oreg. O4 ....6.025
Seattle B3 .....6.025
S.Chicago,Ill. U5, W14.5.275
S.SanFrancisco B3 ....5.925
Sterling,Ill. N15 .....5.275
Torrance,Calif. C11 ....5.975
Weirton,W.Va. W6 ....5.275

Wide Flange
Bethlehem,Pa. B2 ....5.325
Clairton,Pa. U5 .....5.275
Fontana,Calif. K1 ....6.225
IndianaHarbor,Ind. I-2.5.275
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 .....5.275
Phoenixville,Pa. P4 ...5.325
S.Chicago,Ill. U5 .....5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.65
KansasCity, Mo. S5 ....6.65
Munhall,Pa. U5 .....6.55
S.Chicago,Ill. U5 .....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....7.75
Bessemer,Ala. T2 .....7.75
Bethlehem,Pa. B2 .....7.80
Clairton,Pa. U5 .....7.75
Fairfield,Ala. T2 .....7.75
Fontana,Calif. K1 .....8.55
Gary,Ind. U5 .....7.75
Geneva,Utah C11 .....7.75
Houston S5 .....7.85
Ind.Harbor,Ind. I-2, Y1 7.75
Johnstown,Pa. B2 .....7.80
KansasCity,Mo. S5 ....7.85
Lackawanna,N.Y. B2 ..7.80
LosAngeles B3 .....8.45
Munhall,Pa. U5 .....7.75
Seattle B3 .....8.50
S.Chicago,Ill. U5, W14..7.75
S.SanFrancisco B3 ....8.40
Struthers,O. Y1 .....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 .....7.75
S.Chicago,Ill. U5 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.325
Lackawanna,N.Y. B2..5.325
Munhall,Pa. U5 .....5.275
S.Chicago,Ill. U5 .....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 .....6.225
S.Chicago,Ill. U5 .....6.225
Weirton,W.Va. W6 ....6.225

PLATES

PLATES, Carbon Steel
Ala.City, Ala. R2 .....5.10
Aliquippa,Pa. J5 .....5.625
Ashland,Ky. (15) A10..5.10
Bessemer,Ala. T2 .....5.10
Clairton,Pa. U5 .....5.10
Claymont,Del. C22 .....5.10
Cleveland J5, R2 .....5.20
Coatesville,Pa. L7 .....5.10
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 .....5.20
Fairfield,Ala. T2 .....5.10
Fontana,Calif.(30) K1 ..5.90
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.10
GraniteCity,Ill. G4 .....5.30
Harrisburg,Pa. P4 .....5.80
Houston S5 .....5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown, Pa. B2 .....5.10
Lackawanna,N.Y. B2 ..5.10
LoneStar,Tex. L6 .....5.45
Mansfield,O. E6 .....5.10
Minnequa,Colo. C10 ....5.95
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Pittsburgh J5 .....5.10
Riverdale,Ill. A1 .....5.10
Seattle B3 .....6.00
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 .....5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Youngstown R2, U5, Y1.5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....6.75
Fontana,Calif. K1 .....7.55
Geneva,Utah C11 .....6.75
Houston S5 .....6.85
Johnstown,Pa. B2 .....6.75
SparrowsPoint,Md. B2 ..6.75

PLATES, Wrought Iron
Economy,Pa. B14 .....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.625
Bessemer,Ala. T2 .....7.625
Clairton,Pa. U5 .....7.625
Claymont,Del. C22 .....7.625
Cleveland J5, R2 .....7.625
Coatesville,Pa. L7 .....7.925
Conshohocken,Pa. A3 ..7.625
Economy,Pa. B14 .....7.625
Ecorse,Mich. G5 .....7.725
Fairfield,Ala. T2 .....7.625
Farrell,Pa. S3 .....7.625
Fontana,Calif.(30) K1 .8.425
Gary,Ind. U5 .....7.625
Geneva,Utah C11 .....7.625
Houston S5 .....7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 .....7.625
Munhall,Pa. U5 .....7.625
Pittsburgh J5 .....7.625
Seattle B3 .....8.525
Sharon,Pa. S3 .....7.625
S.Chicago,Ill. U5, W14 7.625
SparrowsPoint,Md. B2..7.625
Warren,O. R2 .....7.625
Youngstown U5 .....7.625

PLATES, ALLOY
Aliquippa,Pa. J5 .....7.20
Claymont,Del. C22 .....7.20
Coatesville,Pa. L7 .....7.20
Economy,Pa. B14 .....7.20
Farrell,Pa. S3 .....7.20
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 .....7.20
Houston S5 .....7.30
Ind.Harbor,Ind. Y1 ....7.20
Johnstown,Pa. B2 .....7.20
Lowellville,O. S3 .....7.20
Munhall,Pa. U5 .....7.20
Newport,Ky. A2 .....7.20
Pittsburgh J5 .....7.20
Seattle B3 .....8.10
Sharon,Pa. S3 .....7.20
S.Chicago,Ill. U5, W14..7.20
SparrowsPoint,Md. B2 ..7.20
Youngstown Y1 .....7.20

FLOOR PLATES
Cleveland J5 .....6.175
Conshohocken,Pa. A3 ..6.175
Ind.Harbor,Ind. I-2 ...6.175
Munhall,Pa. U5 .....6.175
S.Chicago,Ill. U5 .....6.175

PLATES, Ingot Iron
Ashland c.l. (15) A10..5.35
Ashland l.c.l. (15) A10..5.85
Cleveland c.l. R2 .....5.85
Warren,O. c.l. R2 .....5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.425
Aliquippa,Pa.(9) J5 ...5.425
Alton,Ill. L1 .....5.625
Atlanta(9) A11 .....5.625
Bessemer,Ala.(9) T2 ..5.425
Birmingham(9) C15 ...5.425
Bridgeport,Conn.(9) N19 5.65
Buffalo(9) R2 .....5.425
Clairton,Pa. (9) U5 ....5.425
Cleveland(9) R2 .....5.425
Ecorse,Mich.(9) G5 ....5.525
Emeryville,Calif. J7 ...6.175
Fairfield,Ala(9) T2 ...5.425
Fairless,Pa. (9) U5 ...5.575
Fontana,Calif.(9) K1 ...6.125
Gary,Ind.(9) U5 .....5.425
Houston (9) S5 .....5.675
Ind.Harbor(9) I-2, Y1 5.425
Johnstown,Pa.(9) B2 ...5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
LosAngeles(9) B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 .....6.125
N.T'wanda,N.Y.(46)B11 5.775
Pittsburg,Calif.(9) C11..6.125
Pittsburgh(9) J5 .....5.425
Portland,Oreg. O4 .....6.175
Seattle B3, N14 .....6.175
S.Ch'c'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5..5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.425
Sterling,Ill.(9) N15 ....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ...5.425
Torrance,Calif.(9) C11..6.125
Youngstown(9) R2, U5..5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 .....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.475
Bethlehem,Pa. B2 .....6.475
Bridgeport,Conn. N19 ..6.55
Buffalo R2 .....6.475
Canton,O. R2, T7 ....6.475
Clairton,Pa. U5 .....6.475
Detroit S41 .....6.475
Economy,Pa. B14 .....6.475
Ecorse,Mich. G5 .....6.575
Fairless,Pa. U5 .....6.625
Farrell,Pa. S3 .....6.475
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 .....6.475
Houston S5 .....6.725
Ind.Harbor,Ind. I-2, Y1 6.475
Johnstown,Pa. B2 .....6.475
KansasCity,Mo. S5 ....6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 .....6.475
LosAngeles B3 .....7.525
Massillon,O. R2 .....6.475
Midland,Pa. C18 .....6.475
Pittsburgh J5 .....6.475
Sharon,Pa. S3 .....6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 ....6.475
Struthers,O. Y1 .....6.475
Warren,O. C17 .....6.475
Youngstown U5 .....6.475

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....7.925
Bessemer,Ala. T2 .....7.925
Bethlehem,Pa. B2 .....7.925
Bridgeport,Conn. N19 ..7.95
Clairton,Pa. U5 .....7.925
Cleveland R2 .....7.925
Ecorse,Mich. G5 .....8.025
Fairfield,Ala. T2 .....7.925
Fontana,Calif. K1 .....8.625
Gary,Ind. U5 .....7.925
Houston S5 .....8.175
Ind.Harbor,Ind. Y1 ....7.925
Johnstown,Pa. B2 .....7.925
KansasCity,Mo. S5 ....8.175
Lackawanna,N.Y. B2..7.925
LosAngeles B3 .....8.625
Pittsburgh J5 .....7.925
Seattle B3 .....8.675
S.Chicago,Ill. U5, W14 7.925
S.Duquesne,Pa. U5 ....7.925
S.San Francisco B3 ...8.675
Struthers,O. Y1 .....7.925
Youngstown U5 .....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.575
Houston(9) S5 .....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
Sterling,Ill. N15 .....5.525
Sterling,Ill.(1) N15 ...5.425
Tonawanda,N.Y. B12 ...5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.425
Atlanta A11 .....5.625
Joliet,Ill. P22 .....5.425
Niles,Calif. P1 .....6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 .....6.175
SanFrancisco S7 .....6.275
Seattle B3 .....6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.80
KansasCity,Mo. S5 ....6.80
Pittsburgh J5 .....6.55
Youngstown U5 .....6.55

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ...9.925
BeaverFalls,Pa. M12 ..9.925
Camden,N.J. P13 ....10.10
Chicago W18 .....9.925
Cleveland C20 .....9.925
Elyria,O. W8 .....9.925
LosAngeles P2, S30 (Grade A) 11.30
(Grade B) 11.80
Monaca,Pa. S17 .....9.925
Newark,N.J. W18 ....10.10
SpringCity,Pa. K3 ....10.10
Warren,O. C17 .....9.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.30
BeaverFalls,Pa. M12,R2 7.30
Birmingham C15 .....7.90
Bridgeport,Conn. N19 ..7.65
Buffalo B5 .....7.35
Camden,N.J. P13 .....7.75
Carnegie,Pa. C12 .....7.30
Chicago W18 .....7.30
Cleveland A7, C20 ....7.30
Detroit B5, P17 .....7.50
Detroit S41 .....7.30
Donora,Pa. A7 .....7.30
Elyria,O. W8 .....7.30
FranklinPark,Ill. N5 ...7.30
Gary,Ind. R2 .....7.30
GreenBay,Wis. F7 .....7.30
Hammond,Ind. J5, L2 ..7.30
Hartford,Conn. R2 .....7.80
Harvey,Ill. B5 .....7.30
LosAngeles (49), S30 ..8.75
LosAngeles P2, R2 ...8.75
Mansfield,Mass. B5 ....7.85
Massillon,O. R2, R8 ...7.30
Midland,Pa. C18 .....7.30
Monaca,Pa. S17 .....7.30
Newark,N.J. W18 .....7.75
NewCastle,Pa.(17) B4 ..7.30
Pittsburgh J5 .....7.30
Plymouth,Mich. P5 ....7.55
Putnam,Conn. W18 ....7.85
Readville,Mass. C14 ...7.85
S.Chicago,Ill. W14 ....7.30
SpringCity,Pa. K3 .....7.75
Struthers,O. Y1 .....7.30
Warren,O. C17 .....7.30
Willimantic,Conn. J5 ..7.80
Waukegan,Ill. A7 .....7.30
Youngstown F3, Y1 ....7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....8.775
BeaverFalls,Pa.M12,R2 8.775
Bethlehem,Pa. B2 .....8.775
Bridgeport,Conn. N19 ..8.925
Buffalo B5 .....8.775
Camden,N.J. P13 .....8.95
Canton,O. T7 .....8.775
Carnegie,Pa. C12 .....8.775
Chicago W18 .....8.775
Cleveland A7, C20 ....8.775
Detroit B5, P17 .....8.975
Detroit S41 .....8.775
Donora,Pa. A7 .....8.775
Elyria,O. W8 .....8.775
FranklinPark,Ill. N5 ...8.775
Gary,Ind. R2 .....8.775
GreenBay,Wis. F7 .....8.775
Hammond,Ind. J5, L2..8.775
Hartford,Conn. R2 .....9.075
Harvey,Ill. B5 .....8.775
Lackawanna,N.Y. B2 ..8.775
LosAngeles P2 .....10.65
LosAngeles S30 .....10.75
Mansfield,Mass. B5 ....9.075
Massillon,O. R2, R8 ...8.775
Midland,Pa. C18 .....8.775
Monaca,Pa. S17 .....8.775
Newark,N.J. W18 .....8.95
Plymouth,Mich. P5 ....8.975
S.Chicago Ill W14 .....8.775
SpringCity,Pa. K3 .....8.95
Struthers,O. Y1 .....8.775
Warren,O. C17 .....8.775
Waukegan,Ill. A7 .....8.775
Worcester,Mass. A7 ....9.075
Youngstown F3, Y1 ...8.775

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ....5.425
Atlanta A11 .....5.625
Birmingham C15, S42 .5.425
Bridgeport,Conn. N19 ..5.65
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....5.775
Emeryville,Calif. J7 ..6.175
Fairfield,Ala. T2 ....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 ....6.125
Ft.Worth,Tex.(4)(26)T4 5.875
Gary,Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2,Y1 5.425
Johnstown,Pa. B2 ....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 ...5.675
Lackawanna,N.Y. B2..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ..6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 ....5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2 .5.425
Sterling,Ill.(1) N15 ..5.425
Sterling,Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..6.00
Torrance,Calif. C11....6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.65
Chicago U8 .....6.91
Cleveland U8 .....6.89
Johnstown,Pa. B2 ....7.08
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Philadelphia U8 .....7.38
Pittsburgh J5, U8 ....7.10
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 ....7.08
St.Paul U8 .....7.92
Williamsport,Pa. S19 ..7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy,(Staybolt)B14 18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 .5.325
ChicagoHts.(4)(44) I-2, .5.425
ChicagoHts.(4) C2 ....5.425
Ft.Worth,Tex.(26) T4..5.875
Franklin,Pa. (3) F5 ..5.325
Franklin,Pa. (4) F5 ..5.425
JerseyShore,Pa.(3) J8 ..5.30
Marion,O.(3) P11 ....5.325
Tonawanda(3) R12 ....5.325
Tonawanda(4) B12 ....6.00
Williamsport,Pa. (3)S19 5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ....4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10 ..4.925
Cleveland J5, R2 ....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 ....4.925
Fairless,Pa. U5 .....4.975
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....4.925
Geneva,Utah C11 ....5.025
GraniteCity,Ill.(8) G4..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 .....4.925
Lackawanna,N.Y. B2 .4.925
Mansfield,O. E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ..4.925
Niles,O. M21, S3 ....4.925
Pittsburg,Calif. C11 ..5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 ....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2 .4.925
Steubenville,O. W10 ..4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5, Y1 ..4.925

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ...8.10

SHEETS, H.R.(14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 .....7.275
Fairless,Pa. U5 .....7.325
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 ....8.175
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2, Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna (35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5, W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2 .7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ....7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.05
Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ..6.05
Fontana,Calif. K1 ....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 ....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ...7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 ....6.05
SparrowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ...6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville,O. W10 .....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.975
Ecorse,Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1....10.275
Gary,Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna (37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint (38) B2 8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.95	7.20
Canton,O. R2	6.95	7.45
Fairfield T2	6.95	7.20
Gary,Ind. U5	6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	6.95	7.20
Irvin,Pa. U5	6.95	7.20
Kokomo,Ind. C16	7.05	...
MartinsFry. W10	6.95	7.20
Pitts.,Calif. C11	7.70	...
Pittsburgh J5	6.95	...
SparrowsPt. B2	6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 .. 7.20

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 ....6.60‡
Ashland,Ky. A10 ....6.60†
Canton,O. R2 .....6.60‡
Dover,O. R1 .....6.60†
Fairfield,Ala. T2 ....6.60†
Gary,Ind. U5 .....6.60*
GraniteCity,Ill. G4 ....6.80*
Ind.Harbor,Ind. I-2 ...6.60†
Irvin,Pa. U5 .....6.60*
Kokomo,Ind. C16 ....6.70‡
MartinsFerry,O. W10 ..6.60*
Middletown,O. A10 ....6.60†
Pittsburg,Calif. C11 ...7.35*
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ...6.60†
Warren,O. R2 .....6.60†
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ..9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland (28) R2 ...7.425
Niles,O. (28) R2 ....7.425
Weirton,W.Va. W6 ..7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).9.25
Butler,Pa. A10 (type 2).9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.625
Cleveland R2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.825
Ind.Harbor,Ind. I-2,Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 ....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.65
Ind.Harbor,Ind. I-2 ..8.475
Yorkville,O. W10 ....8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.00
Gary,Ind. U5 .....7.00
Mansfield,O. E6 .....7.00
Middletown,O. A10 ....7.00
Niles,O. M21, S3 .....7.00
Warren,O. R2 .....7.00
Weirton,W.Va. W6 ....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.40

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve.Cold Rolling Mills
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Div., Sharon Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md.Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N19 Northeastern Steel Corp.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Div. Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.925
Allenport,Pa. P7	4.925
Alton,Ill. L1	5.125
Ashland,Ky.(8) A10	4.925
Atlanta A11	5.125
Bessemer,Ala. T2	4.925
Birmingham C15	4.925
Buffalo (27) R2	4.925
Conshohocken,Pa. A3	4.975
Detroit M1	5.025
Ecorse,Mich. G5	5.025
Fairfield,Ala. T2	4.925
Fontana, Calif. K1	5.825
Gary,Ind. U5	4.925
Ind.Harbor,Ind. I-2, Y1	4.925
Johnstown,Pa. (25) B2	4.925
Lackaw'na,N.Y.(25) B2	4.925
LosAngeles(25) B3	5.675
Minnequa,Colo. C10	6.025
Pittsburg,Calif. C11	5.675
Riverdale,Ill. A1	4.925
SanFrancisco S7	6.35
Seattle(25) B3	6.35
Seattle N14	6.35
Sharon,Pa. S3	4.925
S.SanFrancisco(25) B3	5.675
SparrowsPoint,Md. B2	4.925
Sterling,Ill. (1) N15	4.925
Sterling,Ill. N15	5.025
Torrance,Calif. C11	5.675
Warren,O. R2	4.925
Weirton,W.Va. W6	4.925
Youngstown U5	4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.10
Farrell,Pa. S3	8.10
Gary,Ind. U5	8.10
Houston S5	8.35
Ind.Harbor,Ind. Y1	8.10
KansasCity,Mo. S5	8.35
LosAngeles B3	9.30
Lowellville,O. S3	8.10
Newport,Ky. A2	8.10
Sharon, Pa. A2	8.10
S.Chicago,Ill. W14	8.10
Youngstown U5, Y1	8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	7.325
Conshohocken,Pa. A3	7.325
Ecorse,Mich. G5	7.425
Fairfield,Ala. T2	7.325
Farrell,Pa. S3	7.325
Gary,Ind. U5	7.325
Ind.Harbor,Ind. I-2, Y1	7.325
Lackawanna,N.Y. B2	7.325
LosAngeles(25) B3	8.075
Seattle(25) B3	8.325
Sharon,Pa. S3	7.325
S.Chicago,Ill. W14	7.325
S.SanFrancisco(25) B3	8.075
SparrowsPoint,Md. B2	7.325
Warren,O. R2	7.325
Weirton,W.Va. W6	7.325
Youngstown U5, Y1	7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.175
Warren,O. R2	5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.15
Baltimore T6	7.15
Boston T6	7.70
Buffalo S40	7.15
Cleveland A7, J5	7.15
Conshohocken,Pa. A3	7.20
Dearborn,Mich. D3	7.25
Detroit D2, M1, P20	7.25
Dover,O. G6	7.15
Ecorse,Mich. G5	7.25
Evanston,Ill. M22	7.25
Follansbee,W.Va. F4	7.15
Fontana,Calif. K1	9.00
Franklin Park,Ill. T6	7.25
Ind.Harbor,Ind. Y1	7.15
Indianapolis J5	7.30
LosAngeles J5	9.05
LosAngeles C1	9.20
NewBedford,Mass. R10	7.60
NewBritain(10) S15	7.15
NewCastle,Pa. B4, E5	7.15
NewHaven,Conn. D2	7.60
NewKensington,Pa. A6	7.15
Pawtucket,R.I. R3	7.80
Pawtucket,R.I. N8	7.70
Philadelphia(45) P24	7.70
Pittsburgh J5	7.15
Riverdale,Ill. A1	7.25
Rome,N.Y. (32) R6	7.15
Sharon,Pa. S3	7.15
Trenton,N.J. (31) R5	8.30
Wallingford,Conn. W2	7.60
Warren,O. R2, T5	7.15
Weirton,W.Va. W6	7.15
Worcester,Mass. A7	7.70
Youngstown J5, Y1	7.15

STRIP, Cold-Rolled Alloy

Boston T6	15.40
Carnegie,Pa. S18	15.05
Cleveland A7	15.06
Dover,O. G6	15.05
Farrell,Pa. S3	15.05
FranklinPark,Ill. T6	15.05
Harrison,N.J. C18	15.05
Indianapolis J5	15.20
Lowellville,O. S3	15.05
Pawtucket,R.I. N8	15.40
Riverdale,Ill. A1	15.05
Sharon,Pa. S3	15.05
Worcester,Mass. A7	15.35
Youngstown J5	15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.45
Dearborn,Mich. D3	10.60
Dover,O. G6	10.45
Ecorse,Mich. G5	10.55
Farrell,Pa. S3	10.50
Ind.Harbor,Ind. Y1	10.65
Sharon,Pa. S3	10.50
Warren,O. R2	10.45

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	....	....
Fostoria,O. S1	10.05	11.15	13.10	16.10	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn.(10) S15	8.95	10.40	12.60	15.60	18.55
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	18.10	21.95	26.30
Buffalo W12	...	...	18.10	....	....
Fostoria,O. S1	...	...	18.30	22.15	....
FranklinPark,Ill. T6	...	...	18.45	22.30	26.65
Harrison,N.J. C18	...	...	18.10	21.95	26.30
NewYork W3	...	...	18.10	21.95	26.30
Palmer,Mass. W12	...	...	18.10	....	....
Trenton,N.J. R5	...	...	18.10	21.95	26.30
Worcester,Mass. A7, T6	...	...	18.10	21.95	26.30
Youngstown J5	...	...	18.45	22.30	26.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.90

STRIP, C.R. Electrogalvanized

Cleveland A7	7.15*
Dover,O. G6	7.15*
Evanston,Ill. M22	7.25*
Riverdale,Ill. A1	7.25*
Warren,O. B9, T5	7.15*
Worcester,Mass. A7	7.70*
Youngstown J5	7.15*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	7.275

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Riverdale,Ill. A1	5.50
Sharon,Pa. S3	5.35
Youngstown U5	5.35

SILICON STEEL

H.R.SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95
Zanesville,O. A10 (SP Coils)	....	....	11.55	12.65	13.70

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed 1½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.35	12.05	13.15	14.20
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.825*	11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2	9.625†	10.85*	11.55*	12.65*	....
Mansfield,O. E6	9.625*	11.35	12.05	13.50	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10(FP Coils)	...	11.35	12.05	13.15	14.20

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	14.75	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	17.60	19.20	19.70	20.20	....	....
Butler,Pa. A10	....	....	19.20	19.70	20.20	....
Vandergrift,Pa. U5	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.05	$10.30
Fairfield,Ala. T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif. K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Irvin,Pa. U5	10.05	10.30
Pitts.,Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va. W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.85
Fairfield,Ala. T2	7.95
Fairless,Pa. U5	7.95
Fontana,Calif. K1	8.60
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. I-2, Y1	7.85
Irvin,Pa. U5	7.85
Niles,O. R2	7.85
Pittsburg,Calif. C11	8.60
SparrowsPoint,Md. B2	7.95
Weirton,W.Va. W6	7.85
Yorkville,O. W10	7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.50
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. Y1	7.50
Irvin,Pa. U5	7.50
Yorkville,O. W10	7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$9.70
Irvin,Pa. U5	9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5	$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.65
Aliquippa,Pa. J5	7.65
Alton,Ill. L1	7.85
Atlanta A11	7.85
Bartonville,Ill. K4	7.75
Buffalo W12	7.65
Chicago W13	7.65
Cleveland A7, C20	7.65
Crawfordsville,Ind. M8	7.75
Donora,Pa. A7	7.65
Duluth A7	7.65
Fairfield,Ala. T2	7.65
Fostoria,O.(24) S1	7.75
Houston S5	7.90
Jacksonville,Fla. M8	8.00
Johnstown,Pa. B2	7.65
Joliet,Ill. A7	7.65
KansasCity,Mo. S5	7.90
Kokomo,Ind. C16	7.75
LosAngeles B3	8.60
Minnequa,Colo. C10	7.90
Monessen,Pa. P7, P16	7.65
N.Tonawanda,N.Y. B11	7.65
Palmer,Mass. W12	7.95
Pittsburg,Calif. C11	8.60
Portsmouth,O. P12	7.65
Rankin,Pa. A7	7.65
S.Chicago,Ill. R2	7.65
S.SanFrancisco C10	8.60
SparrowsPoint,Md. B2	7.75
Sterling,Ill.(1) N15	7.65
Sterling,Ill. N15	7.75
Struthers,O. Y1	7.65
Waukegan,Ill. A7	7.65
Worcester,Mass. A7	7.95

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	12.65
Buffalo W12	12.65
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	12.65
Minnequa,Colo. C10	12.775
Monessen,Pa. P16	12.65
Muncie,Ind. I-7	12.85
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	12.95
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	12.75
Struthers,O. Y1	12.65
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.30
Alton,Ill. L1	9.50
Buffalo W12	9.30
Cleveland A7	9.30
Donora,Pa. A7	9.30
Duluth A7	9.30
Johnstown,Pa. B2	9.30
KansasCity,Mo. S5	9.55
LosAngeles B3	10.25
Minnequa,Colo. C10	9.50
Monessen,Pa. P7, P16	9.30
NewHaven,Conn. A7	9.60
Palmer,Mass. W12	9.60
Pittsburg,Calif. C11	10.25
Portsmouth,O. P12	9.30
Roebling,N.J. R5	9.60
S.Chicago,Ill. R2	9.30
S.SanFrancisco C10	10.25
SparrowsPt.,Md. B2	9.40
Struthers,O. Y1	9.30
Trenton,N.J. A7	9.60
Waukegan,Ill. A7	9.30
Worcester,Mass. A7	9.60

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	9.30
Alton,Ill. L1	9.50
Bartonville,Ill. K4	9.40
Buffalo W12	9.30
Cleveland A7	9.30
Donora,Pa. A7	9.30
Duluth A7	9.30
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.30
KansasCity,Mo. S5	9.55
LosAngeles B3	10.25
Milbury,Mass.(12) N6	9.60
Minnequa,Colo. C10	9.50
Monessen,Pa. P7, P16	9.30
Muncie,Ind. I-7	9.50
Palmer,Mass.(12) W12	9.60
Pittsburg,Calif. C11	10.25
Portsmouth,O. P12	9.30
Roebling,N.J. R5	9.60
S.Chicago,Ill. R2	9.30
S.SanFrancisco C10	10.25
SparrowsPt.,Md. B2	9.40
Struthers,O. Y1	9.30
Trenton,N.J. A7	9.60
Waukegan,Ill. A7	9.30
Worcester,A7, J4, T6	9.60

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	15.80
Bartonville,Ill. K4	15.70
Buffalo W12	15.60
Chicago W13	15.60
Cleveland A7	15.60
Crawfordsville,Ind. M8	15.70
Fostoria,O. S1	15.60
Houston S5	15.85
Jacksonville,Fla. M8	15.95
Johnstown,Pa. B2	15.60
KansasCity,Mo. S5	15.85
Kokomo,Ind. C16	15.60
Minnequa,Colo. C10	15.85
Monessen,Pa. P7, P16	15.60
Muncie,Ind. I-7	15.80
Palmer,Mass. W12	15.90
S.SanFrancisco C10	16.45
Waukegan,Ill. A7	15.60
Worcester,Mass. A7, T6	15.90

ROPE WIRE

Bartonville,Ill. K4	12.75
Buffalo W12	12.75
Fostoria,O. S1	12.75
Johnstown,Pa. B2	12.75
Monessen,Pa. P7	12.75
Muncie,Ind. I-7	12.95
Palmer,Mass. W12	13.05
Portsmouth,O. P12	12.75
Roebling,N.J. R5	13.05
SparrowsPt.,Md. B2	12.85
Struthers,O. Y1	12.75
Worcester,Mass. J4	13.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

Bartonville,Ill. K4	16.55
Monessen,Pa. P16	16.55
Roebling,N.J. R5	17.05

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	11.65
Baltimore T6	11.95
Boston T6	11.95
Buffalo W12	11.65
Chicago W13	11.75
Cleveland A7	11.65
Crawfordsville,Ind. M8	11.65
Dover,O. G6	11.65
Fostoria,O. S1	*11.65*
FranklinPark,Ill. T6	11.75
Kokomo,Ind. C16	11.65
Massillon,O. R8	11.65
Milwaukee C23	11.85
Monessen,Pa. P7, P16	11.65
Palmer,Mass. W12	11.95
Pawtucket,R.I. N8	11.95
Philadelphia P24	11.95
Riverdale,Ill. A1	11.75
Rome,N.Y. R6	11.65
Sharon,Pa. S3	11.65
Trenton,N.J. R5	11.95
Warren,O. B9	11.65
Worcester,Mass. A7, T6	11.95

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla.(20) M8	184
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$9.10

NAILS, Cut (100 lb keg)

To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla.(20) M8	186
Johnstown,Pa. B2	175
Joliet,Ill. A7	175
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150

AlabamaCity,Ala. R2	$10.26
Atlanta A11	10.36
Bartonville,Ill. K4	10.36
Buffalo W12	10.26
Chicago W13	10.26
Crawfordsville,Ind. M8	10.36
Donora,Pa. A7	10.26
Duluth A7	10.26
Fairfield,Ala. T2	10.26
Houston S5	10.51
Jacksonville,Fla. M8	10.82
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	10.26
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	10.36
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	11.04
S.Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$10.60
Atlanta A11	10.70
Bartonville,Ill. K4	10.70
Buffalo W12	10.60
Chicago W13	10.60
Crawfordsville,Ind. M8	10.70
Donora,Pa. A7	10.60
Duluth A7	10.60
Fairfield,Ala. T2	10.60
Houston S5	10.85
Jacksonville,Fla. M8	11.16
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	10.60
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.70
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	11.40
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$10.65
Atlanta A11	10.75
Bartonville,Ill. K4	10.75
Buffalo W12	10.65
Chicago W13	10.65
Crawfordsville,Ind. M8	10.75
Donora,Pa. A7	10.65
Duluth A7	10.65
Fairfield,Ala. T2	10.65
Houston S5	10.90
Jacksonville,Fla. M8	11.21
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	10.65
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	10.75
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	11.45
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	10.75

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	219
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214
Williamsport,Pa. S19	175

FENCE POSTS

Birmingham C15	171
ChicagoHts.,Ill. C2, I-2	172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. C15	171
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	172
Tonawanda,N.Y. B12	174

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198*
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	203
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196*
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198§

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-14½ga.J5	190§
Atlanta A11	192*
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	197
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192§

WIRE (16 gage)	An'ld Galv. Stone	Stone
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa. J5	17.15	18.95
Bartonville,Ill. K4	17.25	19.05
Cleveland A7	17.15	....
Crawf'dsville MS	17.25	19.05
Fostoria,O. S1	17.65	19.20†
Houston S5	17.40	18.95**
Jacksonville M8	17.50	19.30
Johnstown B2	17.15	18.95§
Kan.City,Mo. S5	17.40	....
Kokomo C16	17.25	18.80†
Minnequa C10	17.40	18.95**
P'lm'r,Mass. W12	17.45	19.00†
Pitts.,Calif. C11	17.50	19.05†
SparrowsPt. B2	17.25	19.05§
Sterling(37) N15	17.25	19.05§
Waukegan A7	17.15	18.70†
Worcester A7	17.45	....

WIRE, Merchant Quality (6 to 8 gage)

	An'ld Galv.
Ala.City,Ala. R2	8.65 9.20**
Aliquippa J5	8.65 9.325§
Atlanta(48) A11	8.75 9.425*
Bartonville(48) K4	8.75 9.425
Buffalo W12	8.65 9.20†
Cleveland A7	8.65 ....
Crawfordsville M8	8.75 9.425
Donora,Pa. A7	8.65 9.20†
Duluth A7	8.65 9.20†
Fairfield T2	8.65 9.20†
Houston(48) S5	8.90 9.45**
Jacks'ville,Fla. M8	9.00 9.675
Johnstown B2(48)	8.65 9.325§
Joliet,Ill. A7	8.65 9.20†
Kans.City(48) S5	8.90 9.45**
Kokomo C16	8.75 9.30†
LosAngeles B3	9.60 10.275§
Minnequa C10	8.90 9.45**
Monessen P7(48)	8.65 9.25*
Palmer,Mass. W12	8.95 9.50†
Pitts.,Calif. C11	9.60 10.15†
Rankin,Pa. A7	8.65 9.20†
S.Chicago R2	8.65 9.20**
S.SanFran. C10	9.60 10.15**
Spar'wsPt.B2(48)	8.75 9.425§
Sterling(48) N15	8.90 9.575§
Sterling(1)(48)	8.80 9.475§
Struthers,O.(48)Y1	8.65 9.30†
Worcester,Mass.A7	8.95 9.50†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:

6 in. and shorter	49.0
Longer than 6 in.	39.0

⅝ in. thru 1 in.:

6 in. and shorter	39.0
Longer than 6 in.	35.0

1⅛ in. and larger:

All lengths	35.0

Undersized Body (rolled thread)

½ in. and smaller:

6 in. and shorter	49.0

Carriage, Machine, Lag Bolts

Hot Galvanized:

½ in. and smaller:

6 in. and shorter	29.0
Longer than 6 in.	15.0

⅝ in. and larger:

All lengths	12.0

Lag Bolts (all diam.)

6 in. and shorter	49.0
Longer than 6 in.	39.0

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter 49.0

Larger than ½ in. or longer than 6 in. 39.0

Blank Bolts 39.0

Step, Elevator, Tire Bolts 49.0

Stove Bolts, Slotted:

⅛ to ¼ in. incl.:

3 in. and shorter	55.0

⅜ to ½ in., inclusive 55.0

NUTS

Reg. & Heavy Square Nuts:

All sizes	55.5

Square Nuts, Reg. & Heavy, Hot Galvanized:

All sizes	41.0

Hex Nuts, Reg. & Heavy, Hot Pressed:

¾ in. and smaller	60.5
⅞ in. to 1 in., incl.	55.5
1⅛ in. to 1½ in., incl.	58.5
1⅝ in. and larger	53.5

Hex Nuts, Reg. & Heavy, Cold Punched:

¾ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5

Hex Nuts, All Types, Hot Galvanized:

¾ in. and smaller	46.5
⅞ in. to 1 in., incl.	41.5
1⅛ in. to 1½ in., incl.	46.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	60.5
¾ in. to 1 in., incl.	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:

6 in. and shorter:	
⅝ in. and smaller	40.0
¾, ⅞, and 1 in. diam.	22.0
Longer than 6 in.:	
⅝ in. and smaller	8.0
¾, ⅞, and 1 in. diam.	+6.0

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	26.0
¾, ⅞, and 1 in. diam.	3.0
Longer than 6 in.:	
⅝ in. and smaller	+13.0
¾, ⅞, and 1 in. diam.	+32.0

Flat Head Capscrews:

¾ in. and smaller +76.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam.:	
6 in. and shorter	Net
Longer than 6 in.	+23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ½ in., larger 12.25 7/16 in. under: List less 19%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	23.38
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.05	34.20
2¼	13	43.29	50.75	38.52
2¼	12	46.99	55.06	41.81
2½	12	51.76	60.65	46.05
2¾	12	56.04	65.67	49.88
3	12	59.76	70.03	53.19

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Tee Rails All 60 lb No. 2	Tee Rails Under
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Gary,Ind. U5	5.525	5.425	....	....
Huntington,W.Va. C15	....	....	....	6.50
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	....
Johnstown,Pa. B2	....	....	....(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	....
Williamsport,Pa. S19	....	....	....	6.50

TIE PLATES

Fairfield,Ala. T2	6.60
Gary,Ind. U5	6.60
Ind.Harbor,Ind. I-2	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Seattle B3	6.75
Steelton,Pa. B2	6.60
Torrance,Calif. C11	6.75

JOINT BARS

Bessemer,Pa. U5	6.975
Fairfield,Ala. T2	6.975
Ind.Harbor,Ind. I-2	6.975
Joliet,Ill. U5	6.975
Lackawanna,N.Y. B2	6.975
Minnequa, Colo. C10	6.975
Steelton,Pa. B2	6.975

AXLES

Ind.Harbor,Ind. S13	8.775
Johnstown, Pa. B2	8.775

TRACK BOLTS, Untreated

Cleveland R2	14.75
KansasCity,Mo. S5	14.75
Lebanon,Pa. B2	14.75
Minnequa,Colo. C10	14.75
Pittsburgh P14	14.75
Seattle B3	15.25

SCREW SPIKES

Lebanon,Pa. B2	14.50

STANDARD TRACK SPIKES

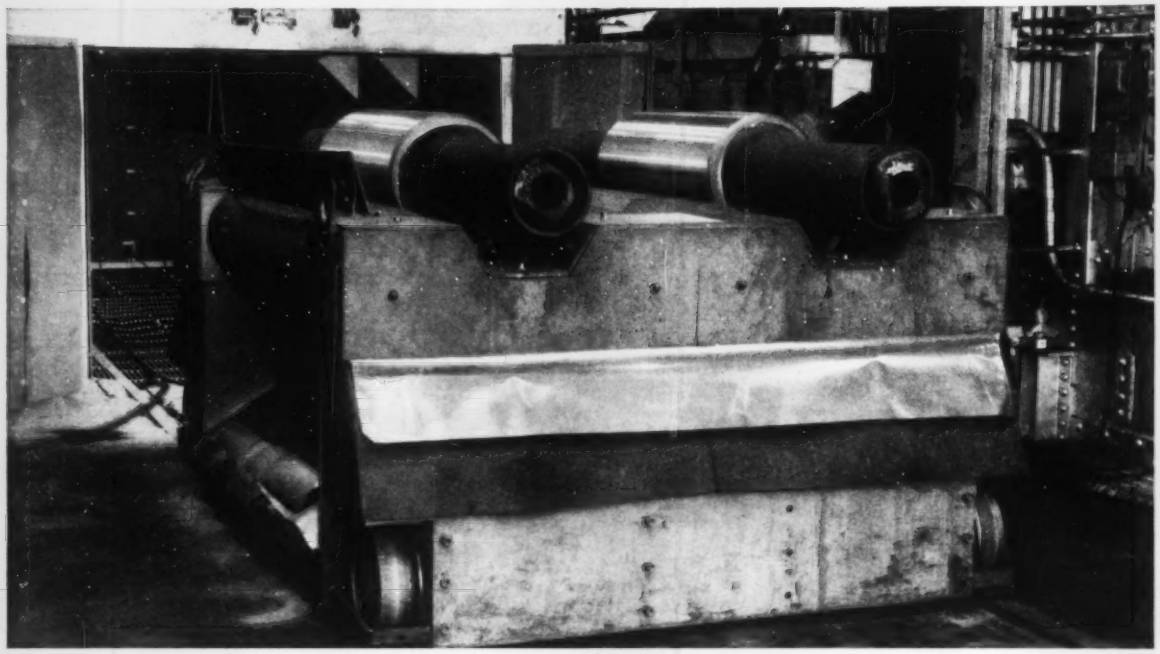
Fairfield, Ala. T2	9.75
Ind.Harbor,Ind. I-2, Y1	9.75
KansasCity,Mo. S5	9.75
Lebanon,Pa. B2	9.75
Minnequa,Colo. C10	9.75
Pittsburgh J5	9.75
Seattle B3	10.25
S.Chicago,Ill. R2	9.75
Struthers,O. Y1	9.75
Youngstown R2	9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 13 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(21) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) 3/8" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Del. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone,6.045c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over 5/8 in.; 7.60c, for widths 5/8 in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(45) 0.022 in. and lighter, over 0.022", 8.20c.
(46) Special quality.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.30c, over 3½ in. and other shapes.

You get more
than Quality
when you specify
Jessop
high-speed steel
When you need a special steel that cuts fast and deep and stays sharp even when very hot, it's pretty certain you'll ask for "high-speed." And if you're looking for assurance of top quality, you are apt to name by name a company that pioneered in the business of making high-speed steels, contributed materially to their development, and has lab and quality-control techniques well ahead of the field. You're apt to specify Jessop.
But you get more than quality when you specify Jessop high-speed steel. You get good service for two very good reasons. First, Jessop has the capacity to supply demand promptly. It can produce more high-speed products, (namely sheets, plates, bars, forgings, castings and special shapes), at one location than any other company in America. And second, Jessop wants all the high-speed steel business it can get and bends over backwards to please its customers. Send in an order and you'll find out.
JESSOP
STEEL COMPANY · WASHINGTON, PA.

Which advantage is most important to you ?



You get them all in WHEELABRATOR® mechanical mill roll etching

? Uniform etch

? Longer roll life

? Better product finish

? Time savings

? Cost reductions

The mechanical and automatic nature of Wheelabrator mill roll etching brings you all of these advantages. For instance, it eliminates the opportunity for human error. Once calibrated, it automatically produces a uniform etch, with optimum penetration, roll after roll. This also means longer roll life — as much as 30% more service life. There are no areas of shallow etch to cause too-frequent dressing and no areas of too-deep etch to cause waste of roll surface in successive etchings. This uniformity also provides more uniform surface finishes on the final product.

Variety in type and size of abrasive, velocity and volume of abrasive, speed of work travel and rotation and other variables are easily adjusted to provide close control of the surface etch. This means a single machine can produce a wide variety of finishes, each meeting a precise surface roughness specification. Time and cost savings come from speed of etching, recently improved by a work car that carries two rolls at once. This not only saves etching time but also reduces mill delay. In addition, changeover for different finishes is faster and re-roll tonnage is reduced because a flatter strip is produced under increased screwdown pressures.

Why not get all of these advantages in your plant for swift, sure mill roll etching?

WHEELABRATOR®
CORPORATION

509 South Byrkit Srreet Mishawaka, Indiana

WRITE FOR details on the many new improvements in the Wheelabrator method of etching.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	3.5	+23	+8.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+30	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	....	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	....	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.50	55.50
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	....	....	86.50	....	92.75	....	104.50
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	81.50	81.50
316L	....	....	70.00	76.50	77.00	80.75	84.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
330	....	....	106.75	....	106.75	106.75	106.50	106.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	35.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.25	48.25	48.25
420	....	33.50	34.25	41.75	39.25	41.25	45.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co., Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels Inc.; U. S. Steel Corp.; Universal-Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel Co., subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	40.00
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.40	49.50	54.50	38.75
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.55	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.95	40.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.305	Cr-Hot Work	0.475
Extra Carbon	0.360	W-Cr Hot Work	0.500
Special Carbon	0.475	V-Cr Hot Work	0.520
Oil Hardening	0.475	Hi-Carbon-Cr	0.925

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.255
18.25	4.25	1	4.75	....	2.500
18	4	2	9	....	2.870
18	4	2	....	....	1.960
18	4	1	....	....	1.795
9	3.5	..	....	....	1.395
13.5	4	3	....	....	2.060
13.75	3.75	2	5	....	2.440
6.4	4.5	1.9	....	5	1.300
6	4	3	....	6	1.545
1.5	4	1	....	8.5	1.155

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
AlabamaCity,Ala. R2	62.00	62.50	....	....
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	....	66.50	....
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.62	69.12	69.12	69.62
Muskegon,Mich., deld.	....	74.12	74.12	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.10	75.60	....
Newark,N.J., deld.	72.29	72.79	73.29	73.79
Philadelphia, deld.	70.01	70.51	71.01	71.59
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield,Ohio, deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry, $9 freight alowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Troy,N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	82.27
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents: Atlanta, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	....	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.61	....	8.76	9.06	11.34#	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	11.07	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.38	10.44	11.45	53.50	9.42	9.73	12.90#	15.28	9.63	9.72	11.20
Buffalo	8.40	9.00	10.07	55.98	8.50	8.80	10.90#	15.00	8.90	8.90	10.45
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.20	9.45	10.00	53.00	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.05	52.43	8.54	8.92	9.31	14.96	9.18	8.93	10.21
Cleveland	8.18	9.45	9.95	55.68	8.33	8.69	10.80#	14.74	9.01	8.79	10.11
Dallas	8.85	10.15	....	....	9.00	8.95	11.01	....	9.00	9.45	10.70
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.06
Detroit	8.43	9.70	10.35	56.50	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	8.45	9.75	8.45	....	8.60	8.55	11.10	....	8.60	9.05	10.30
Jackson, Miss.	8.52	9.79	....	....	8.57	8.94	10.68	....	8.97	8.90	10.74
Los Angeles	9.50	10.75	11.65	57.60	9.50	9.80	12.75	....	9.10	9.55	11.70
Milwaukee	8.33	9.58	10.13	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.35	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	53.08	9.31	9.57	12.76#	15.09	9.35	9.43	10.71
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.00	8.90	9.87	51.94	8.69	8.65	11.51#	15.01	8.50	8.77	9.77**
Pittsburgh	8.18	9.45	10.35	52.00	8.33	8.60	10.80#	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.38	9.55	8.65	14.65#	15.95	8.65	8.30	11.50
Richmond, Va.	8.45	....	10.40	....	9.15	9.15	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.36	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.61	....	8.84	9.21	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	11.00	55.10	9.45	9.70	13.00	16.10	9.50	9.60	12.00
Seattle	9.95	11.15	12.00	57.38	10.00	10.10	14.05	16.35	9.80	9.70	12.10
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	9.95	11.15	12.00	57.38	10.00	10.10	14.05	17.20	9.80	9.70	12.10
Washington	8.48	9.58	....	....	9.06	9.15	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **¼ in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.; #1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; [5]—400 to 9999 lb; [10]—1000 to 1999 lb; [5]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Oliver Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $150; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $190; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Silica Brick (per 1000)

Clearfied, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Phiadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $33-34; Mexican, all rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	28.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$13.00-14.00*
Domestic, concentrates f.o.b. milling points	20.00-22.00

*Before duty.

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.39-1.42 per long ton unit, c.i.f. U. S. ports, duty for buyer's account: other than Indian, nomnial; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$51.00-53.00
48% 2.8:1	48.00-50.00
48% no ratio	41.00-43.00
South African Transvaal	
48% no ratio	$40.00-41.00
44% no ratio	30.00-30.50
Turkish	
48% 3:1	$55.00-57.00
Domestic	
Rail nearest seller	
18% 3:1	$39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	$2.50-2.60
60-65%	2.60-2.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi River, ocean bags 23,000 lb and over	10.50
F.o.b. Riverton or Camden, N. J., west of Mississippi River	9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over	10.50
F.o.b. Riverton, N. J., west of Mississippi River	9.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe.	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500 lb drum, freight allowed Carlots	39.50
Ton lots	41.50
Antimony, 500 lb lots	42.00*
Brass, 5000-lb lots	31.30-38.40†
Bronze, 5000-lb lots	48.10-52.70†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.065
Nickel-Silver, 5000-lb lots	49.20-61.30†
Phosphor-Copper, 5000-lb lots	59.80
Copper (atomized) 5000-lb lots	40.30-48.80‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.02
Stainless Steel, 316	$1.20
Tin	14.50*
Zinc, 5000-lb lots	17.50-30.70‡

Tungsten:	Dollars
Melting grade, 99% 60 to 200 mesh: 1000 lb and over	3.15
Less than 1000 lb	3.30
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length (Inches)	Per 100 lb
2	24	$60.75
2½	30	39.25
3	40	37.00
4	40	35.00
5⅛	40	34.75
6	60	31.50
7	60	28.25
8, 9, 10	60	28.00
12	72	26.75
14	60	26.75
16	72	25.75
17	60	26.25
18	72	26.25
20	72	25.25
24	84	26.00

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.25
Saginaw, Mich., deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens: New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, Ohio, ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Neville Island (Pittsburgh), Pa., ovens	29.25
Painesville, Ohio, ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
St. Paul, ovens	29.75
Chicago, deld.	33.24
Swedeland, Pa., ovens	29.50
Terre Haute, Ind. ovens	29.75

*Or within $4.85 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	29.50
Industrial xylene	32.00-34.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00-34.00

Cents per pound, producing point

Phenol: Grade 1, 17.50; Grade 2-3, 15.50; Grade 4, 17.50; Grade 5, 16.50; Grade 6, 14.50.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$6.28	$6.23	$6.23	$6.48
Bar Size Angles	6.62	6.57	6.57	6.75
Structural Angles	6.62	6.57	6.57	6.75
I-Beams	6.87	6.82	6.82	7.00
Channels	6.87	6.82	6.82	7.00
Plates (basic bessemer)	8.35	8.30	8.30	8.60
Sheets, H.R.	8.25	8.20	8.20	8.50
Sheets, C. R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.79	26.67	26.67	27.36
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.87	6.82	6.82	7.22
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails (§)	8.38	8.38	8.38	8.58

†Per 82 lb, net, reel. §Per 100-lb kegs, 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton: $245, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered, Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.

Cr 67.71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 30.05c per lb of contained Cr. Packed, c.l. 31.65c, ton 33.45c, less ton 34.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 21.25c, per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 27.50c per lb contained Cr, 14.20c per lb contained Si. 0.75" x down, 28.65c per lb contained Cr, 14.20c per lb contained Si. Delivered.

Chromium Metal Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less carload lot, packed $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 14.20c per lb of contained Si. Packed c.l. 16.70c, ton lot 18.15c, less ton 19.80c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 22.00c per lb of Si. Packed, c.l. 23.65c, ton lot 24.95c, less ton 25.95c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy; ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (1 to 2%). Contract, lump, carload 9.50c, per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, carload packed in box pallets 19.80c, in bags 20.70c; 3000 lb to c.l. in box pallets 21.00c; 2000 lb to c.l. in bags, 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot 2" x D, $4.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $4.30.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5.7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

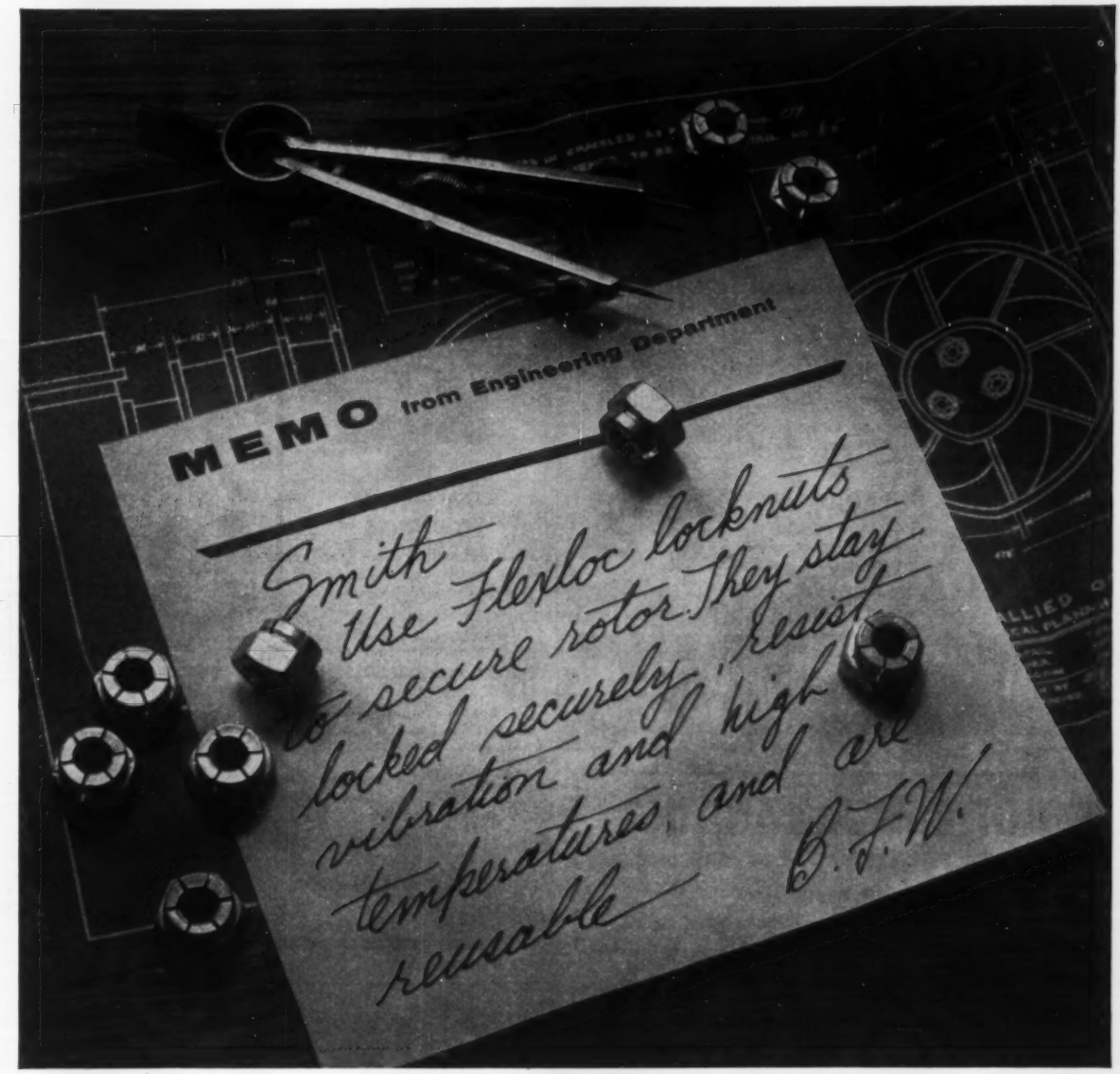
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $110 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa. $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.



Vibration won't loosen FLEXLOC self-locking nuts

Where products must be reliable . . . must stand up under vibration, temperature extremes and hard use . . . designers specify rugged, reliable, precision-built FLEXLOC self-locking nuts.

HERE'S WHY:

FLEXLOC locknuts are strong: tensile strengths far exceed accepted standards. They are uniform: carefully manufactured to assure accurate, lasting locking action. And they are reusable: repeated removal and replacement, frequent adjustments, even rough screw threads will not affect their locking life.

Standard FLEXLOC self-locking locknuts are available in a wide range of standard sizes, types and materials to meet the most critical locknut requirements. Your local industrial distributor stocks them. Write us for complete catalog and technical data. Flexloc Locknut Division, STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

We also manufacture precision titanium fasteners. Write for free booklet.

FLEXLOC® LOCKNUT DIVISION

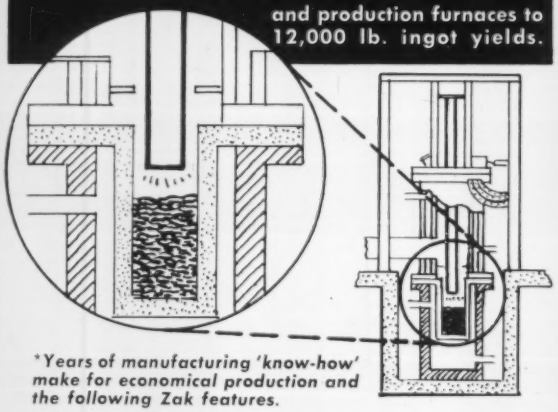
STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

VACUUM ARC RESEARCH FURNACES

and production furnaces to 12,000 lb. ingot yields.



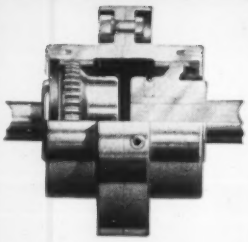
*Years of manufacturing 'know-how' make for economical production and the following Zak features.

Designed for varying size ingot melts by interchanging crucibles — built in safety and production controls — mechanically guaranteed — vacuum tested in microns and certified at plant. Zak engineers will work with your engineering staff on design and installation.

* No company in the US has a longer vacuum furnace production record. *Will quote to your design.*

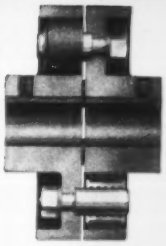
ZAK MACHINE WORKS INC.
TROY (GREEN ISLAND) N. Y.

It pays to Specify
AJAX
The World's Most Complete Line of
FLEXIBLE COUPLINGS



AJAX DIHEDRAL COUPLINGS

AJAX Patented Dihedral tooth shape handles angular and offset misalignment up to 12 degrees.



AJAX RUBBER-BRONZE CUSHIONED COUPLINGS

Safeguard your machines against costly shutdowns. Standard of industry for 37 years. All types and sizes.

Write for Ajax Technical Catalogs. Representatives from coast to coast.

AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, NEW YORK
Also manufacturers of Ajax vibrating conveyors, screens and packers.

HOT DIP GALVANIZING

JOSEPH P. CATTIE & BROTHERS, INC.
2520 East Hagert Street
Phone: Re-9-8911 Philadelphia 25, Pa.

STEEL TUBING

SEAMLESS or WELDED
AIRCRAFT - MECHANICAL
PRESSURE - STAINLESS
STAINLESS PIPE & FITTINGS

SERVICE STEEL
DETROIT · BUFFALO · CHICAGO · CINCINNATI · LOS ANGELES

BROWNING ELECTRIC TRAVELING CRANES AND HOISTS
up to 125-TON CAPACITY
VICTOR R. BROWNING & CO., INC. WILLOUGHBY (Cleveland), OHIO

MODERN ELECTROPLATING

563 PAGES
ILLUSTRATED
Price $9.50 Postpaid

BY ALLEN G. GRAY, Technical Editor, STEEL Magazine.

Brings you a complete, up-to-date one-volume summary of current industrial electroplating processes. The only book that emphasizes both practical aspects and basic theory.

The Penton Publishing Company, Book Department, 1213 West Third St., Cleveland 13, Ohio.

ARE YOU OFFERING A SERVICE?

If your company performs plating, galvanizing, finishing or any one of dozens of metalworking operations on a contract basis, you can attract new customers by inserting an advertisement in the classified pages of STEEL.

Scrap Appears To Be Leveling Out

STEEL's composite on the prime grade is unchanged at $33.17 for the first time in many weeks. Market tone continues soft, with consumers disinterested in acquiring tonnage

Scrap Prices, Page 152

Philadelphia — Under the influence of light buying, domestic scrap prices have declined further. No. 1 heavy melting steel is quoted at $33, delivered; No. 2 heavy melting, $30.50; No. 1 bundles, $34.50; No. 2 bundles, $24.50; No. 1 busheling, $34.50; and electric furnace bundles, $37.50. Mixed borings and turnings are $22.50, short shoveling turnings $24, and machine shop turnings $22.

Heavy turnings are quoted at $30.50, delivered; structurals and plates, $42-$43; and couplers, springs, and wheels, $46. Heavy breakable cast is easier at $38; malleable is quoted at $57.

New York — Brokers have reduced their buying prices on No. 1 heavy melting and No. 1 bundles to $33.50, No. 1 cupola cast to $38-$39, and unstripped motor blocks to $31-$32.

Stainless 18-8 sheets, clips, and solids are quoted at $160-$165. Straight chrome grades are in somewhat brisker demand, with 430 solids holding at $65-$70 and 410 solids at $55-$60.

Boston — The sharp break in heavy melting steel scrap prices is matched by declines in mixed and No. 1 machinery cast material. At $23-$24, shipping point, brokers' buying prices for No. 1 heavy melting are off $3 a ton—that's $28 a ton under prices of the corresponding week last year. Two leading cast grades are also down $3 a ton.

Pittsburgh — Prices on most grades are firm. No. 1 heavy melting is quoted at $33-$34 by most brokers, a slight advance from the recent low point. The higher price is claimed to be justified on the basis of growing reluctance to sell at present levels.

Chicago—With only a few exceptions, scrap prices have held unchanged. The situation is described as weak, and a steelmaking rate that skidded another two points last week to make an eight-point drop since the fourth quarter started may indicate that further price drops can be expected.

Cleveland — There's not much change in the scrap market in this area, or in the Valley. Some material is moving on old orders, but new buying is at a minimum. Stocks of unprepared material are piling up in yards. Quoted prices are nominal, but the market tone continues soft.

A modern baling machine will be installed by Fisher Body Div., General Motors Corp., at its Cleveland Works. Contract for the building to house the baler has been let to the Schirmer-Peterson Co. The facility will handle up to 450 tons of scrap daily. Scrap from the plant's presses will slide down chutes to conveyors running to the baler.

Buffalo—A $2 decline in cast scrap prices was the only change in this market last week. Steel scrap prices are being supported by outstanding orders that carry through November, but the market continues soft.

Little material is coming into dealers' yards. They blame falling prices, reduced collections in rural areas, and a drop in production of factory material. Dealers are having trouble filling current mill orders because of the slow influx of material.

Detroit—The absence of buying has resulted in more pessimism among local scrap dealers and brokers. Water shipping is drawing to a close, leaving docks and local mills piled high with scrap. More scrap is being turned out by the auto plants, which are building operations up to full speed.

Cincinnati—Scrap prices are unchanged, with a market test lacking. Dealers are piling material in their yards. District steelmakers continue to use a larger percentage of hot metal in their melt.

St. Louis — Prices are leveling off, but there is virtually no buying by mills and foundries in this area. Railroad offerings are shrinking. Output of industrial scrap is off. Rural collections are down.

Birmingham—Although there is little buying in this district, scrap prices are unchanged. Dealers and brokers say the long decline in the market appears to be about ended. The only sizable purchase last week was by a local electric furnace plant which took a small quantity of bundles at the published price. Reports from coastal areas show export prices are steady.

Seattle—Scrap continues depressed. The few sales noted do not establish a price basis and published quotations are consid-

(*Please turn to Page* 157)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Nov 20, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 20	$33.17
Nov. 13	33.17
Oct. Avg.	37.37
Nov. 1956	61.83
Nov. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	30.00-31.00
No. 1 factory bundles	36.00-37.00
No. 1 dealer bundles	*33.00-34.00*
No. 2 bundles	28.00-29.00
No. 1 busheling	*33.00-34.00*
Machine shop turnings	17.00-18.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Cut structurals:	
2 ft and under	38.00-39.00
3 ft lengths	37.00-38.00
Heavy turnings	30.00-31.00
Punchings & plate scrap	37.00-38.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Stove plate	35.00-36.00
Unstripped motor blocks	28.00-29.00
Clean auto cast	44.00-45.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
Rails, 2 ft and under	58.00-59.00
Rails, 18 in. and under	59.00-60.00
Angles, splice bars	52.00-53.00
Rails, rerolling	58.00-59.00

Stainless Steel Scrap

18-8 bundles & solids	210.00-215.00
18-8 turnings	115.00-120.00
430 bundles & solids	95.00-100.00
430 turnings	*50.00-55.00*

CLEVELAND

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	22.00-23.00
No. 1 factory bundles	31.00-32.00
No. 1 bundles	28.00-29.00
No. 2 bundles	19.00-20.00
No. 1 busheling	28.00-29.00
Machine shop turnings	11.00-12.00
Short shovel turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut foundry steel	33.00-34.00
Cut structurals, plates 2 ft and under	35.00-36.00
Low phos. punchings & plate	29.00-30.00
Alloy free, short shovel turnings	21.00-22.00
Electric furnace bundles	29.00-30.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Charging box cast	33.00-34.00
Heavy breakable cast	29 00-30.00
Stove plate	36.00-37.00
Unstripped motor blocks	23.00-24.00
Brake shoes	30.00-31.00
Clean auto cast	37.00-38.00
Burnt cast	28.00-29.00
Drop broken machinery	40.00-41.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
R.R. malleable	49.00-50.00
Rails, 2 ft and under	55.00-56.00
Rails, 18 in. and under	56.00-57.00
Rails, random lengths	48.00-49.00
Cast steel	43.00-44.00
Railroad specialties	46.00-47.00
Uncut tires	39.00-40.00
Angles, splice bars	46.00-47.00
Rails, rerolling	54.00-55.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	205.00-210.00
18-8 turnings	90.00-95.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Machine shop turnings	13.00-14.00
Short shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	33.00-34.00
Electric furnace bundles	33.00-34.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00

CHICAGO

No. 1 heavy melt., indus.	34.00-35.00
No. 1 hvy melt., dealer	30.00-31.00
No. 2 heavy melting	29.00-30.00
No. 1 factory bundles	36.00-37.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	20.00-21.00
No. 1 busheling, indus.	34.00-35.00
No. 1 busheling dealer	30.00-31.00
Machine shop turnings	*16.00-17.00*
Mixed borings, turnings	*18.00-19.00*
Short shovel turnings	*18.00-19.00*
Cast iron borings	*18.00-19.00*
Cut structurals, 3 ft.	39.00-40.00
Punchings & plate scrap	40.00-41.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Stove plate	34.00-35.00
Unstripped motor blocks	27.00-28.00
Clean auto cast	40.00-41.00
Drop broken machinery	40.00-41.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
R.R. malleable	45.00-46.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	50.00-51.00
Angles, splice bars	46.00-47.00
Axles	*49.00-50.00*
Rails, rerolling	*47.00-50.00*

Stainless Steel Scrap

18-8 bundles & solids	205.00-215.00
18-8 turnings	105.00-115.00
430 turnings & solids	80.00-90.00
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*21.00-22.00*
No. 2 heavy melting	*18.00-19.00*
No. 1 bundles	*23.00-24.00*
No. 2 bundles	*18.00-19.00*
No. 1 busheling	*21.00-22.00*
Machine shop turnings	*8.00-9.00*
Mixed borings, turnings	*9.00-10.00*
Short shovel turnings	*10.00-11.00*
Punchings & plate scrap	27.00-28.00

Cast Iron Grades

No. 1 cupola	*31.00*
Stove plate	*25.00*
Charging box cast	25.00
Heavy breakable	*24.00*
Unstripped motor blocks	15.00†
Clean auto cast	*33.00*
Malleable	34.00†

†Nominal

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	37.00
No. 2 heavy melting	34.00
No. 1 bundles	37.00
No. 2 bundles	26.00
No. 1 busheling	37.00
Machine shop turnings	17.00
Short shovel turnings	19.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	35.00
Heavy breakable cast	35.00
Unstripped motor blocks	35.00
Brake shoes	40.00
Clean auto cast	43.00
Stove plate	38.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.25
Rails, 18 in. and under	50.00
Rails, random lengths	45.00
Rails, rerolling	*54.00*
Angles, splice bars	47.00

PHILADELPHIA

No. 1 heavy melting	*33.50*
No. 2 heavy melting	*30.50*
No. 1 bundles	*34.50*
No. 2 bundles	*24.50*
No. 1 busheling	*34.50*
Electric furnace bundles	*37.50*
Mixed borings, turnings	*22.50*
Short shovel turnings	*24.00*
Machine shop turnings	22.00†
Heavy turnings	*30.50*
Structurals & plate	*42.00-43.00*
Couplers, springs, wheels	46.00
Rail crops, 2 ft & under	63.00-65.00

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast	*38.00*
Malleable	*57.00*
Drop broken machinery	50.00-51.00

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*33.50*
No. 2 heavy melting	29.00-30.00
No. 1 bundles	*33.50*
No. 2 bundles	21.00-22.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	13.00-14.00
Short shovel turnings	15.00-16.00
Low phos. (structurals & plate)	45.00-46.00

Cast Iron Grades

No. 1 cupola	*38.00-39.00*
Unstripped motor blocks	*32.00*
Heavy breakable	33.00-34.00

Stainless Steel

18-8 sheets, clips, solids	*160.00-165.00*
18-8 borings, turnings	55.00-60.00
430 sheets, clips, solids	*65.00-70.00*
410 sheets, clips, solids	*55.00-60.00*

†Nominal

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*23.00-24.00*
No. 2 heavy melting	*20.00-21.00*
No. 1 bundles	*23.00-24.00*
No. 2 bundles	*12.50-14.00*
No. 1 busheling	*23.00-24.00*
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Short shovel turnings	12.00-13.00
No. 1 cast	33.00-34.00
Mixed cupola cast	*28.00-29.00*
No. 1 machinery cast	*35.00-36.00*

BUFFALO

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	32.00-33.00
No. 2 bundles	27.00-28.00
No. 1 busheling	32.00-33.00
Mixed borings, turnings	18.00-19.00
Machine shop turnings	16.00-17.00
Short shovel turnings	20.00-21.00
Cast iron borings	18.00-19.00
Low phos.	37.00-38.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*39.00-40.00*
No. 1 machinery	*44.00-45.00*

Railroad Scrap

Rails, random lengths	44.00-45.00
Rails, 3 ft and under	51.00-52.00
Railroad specialties	37.00-38.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
No. 1 busheling	30.00-31.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings	*18.00-19.00*
Cast iron borings	18.00-19.00
Low phos. 18 in.	37.00-38.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Heavy breakable cast	32.00-33.00
Charging box cast	32.00-33.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	*34.00-35.00*
Rails, 18 in. and under	54.00-55.00
Rails, random lengths	44.00-45.00

BIRMINGHAM

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
No. 1 busheling	31.00-32.00
Cast iron borings	15.00-16.00
Short shovel turnings	21.00-22.00
Machine shop turnings	20.00-21.00
Bar crops and plates	38.00-39.00
Structurals & plate	38.00-39.00
Electric furnace bundles	35.00-36.00
Electric furnace:	
3 ft and under	33.00-34.00
2 ft and under	34.00-35.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Stove plate	47.00-48.00
Unstripped motor blocks	35.00-36.00
Charging box cast	22.00-23.00
No. 1 wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
Rails, 18 in. and under	49.00-50.00
Rails, rerolling	50.00-51.00
Rails, random lengths	41.00-42.00
Angles, splice bars	40.00-41.00

SEATTLE

No. 1 heavy melting	36.00
No. 1 bundles	35.00
No. 2 heavy melting	34.00
No. 2 bundles	27.00
Machine shop turnings	26.00†
Mixed borings, turnings	26.00†
Electric furnace No. 1	46.00

Cast Iron Grades

No. 1 cupola	35.00†
Heavy breakable cast	32.00†
Unstripped motor blocks	27.00†
Stove plate (f.o.b. plant)	25.00†

†Nominal

LOS ANGELES

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	38.00
No. 2 bundles	30.00
Machine shop turnings	20.00
Shoveling turnings	25.00
Cast iron borings	25.00
Cut structurals and plate 1 ft and under	54.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	52.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	34.00
No. 2 bundles	26.00
Machine shop turnings	20.00
Mixed borings, turnings	20.00
Cast iron borings	20.00
Heavy turnings	20.00
Short shovel turnings	20.00
Cut structurals, 3 ft	48.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	40.00
Stove plate	39.00
Heavy breakable cast	38.00
Unstripped motor blocks	36.00
Clean auto cast	47.00
No. 1 wheels	40.00
Drop broken machinery	47.00

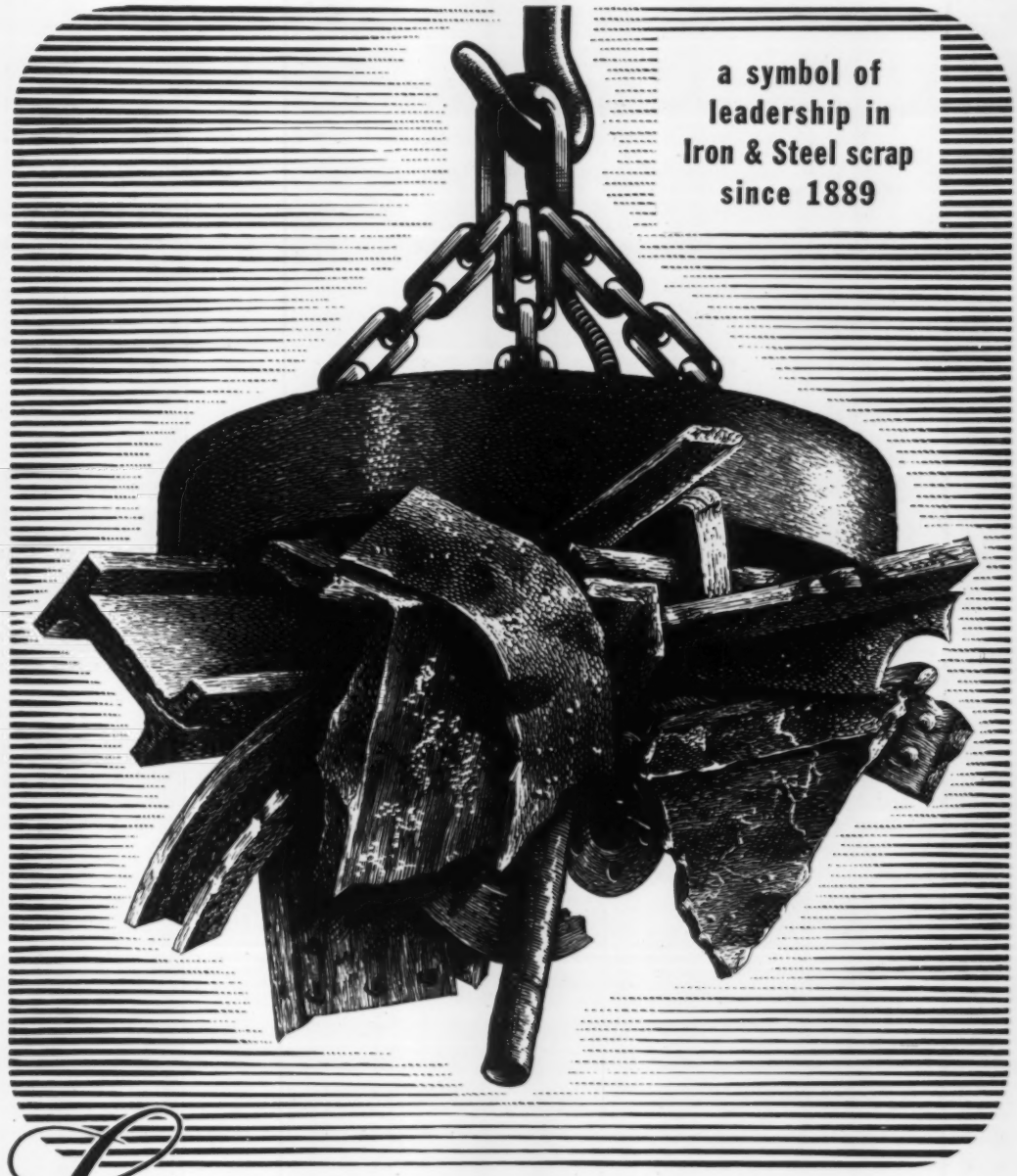
HAMILTON, ONT.

No. 1 heavy melting	35.00
No. 2 heavy melting	30.00
No. 1 bundles	35.00
No. 2 bundles	25.00
Mixed steel scrap	30.00
Mixed borings, turnings	20.00
Busheling, new factory: Prepared	35.00
Unprepared	29.00
Short steel turnings	24.00
Rails, rerolling	43.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.



Luria Brothers and Company, Inc.

MAIN OFFICE
PHILADELPHIA NATIONAL BANK BLDG.
Philadelphia 7, Penna.

PLANTS
LEBANON, PENNA. DETROIT (ECORSE), MICHIGAN
READING, PENNA. PITTSBURGH, PENNA.
MODENA, PENNA. ERIE, PENNA.

OFFICES

BIRMINGHAM, ALA.	HOUSTON, TEXAS	PITTSBURGH, PA.
BOSTON, MASS.	KOKOMO, IND.	PUEBLO, COLORADO
BUFFALO, N. Y.	LEBANON, PENNA.	READING, PENNA.
CHICAGO, ILLINOIS	LOS ANGELES, CAL.	ST. LOUIS, MO.
CLEVELAND, OHIO	MEMPHIS, TENN.	SAN FRANCISCO, CAL.
DETROIT, MICH.	NEW YORK, N. Y.	SEATTLE, WASH.

in Canada MONTREAL, QUEBEC — HAMILTON, ONTARIO

EXPORTS-IMPORTS LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

Merger Plans Announced

Stockholder approval will link American Metal and Climax, Anaconda and Cochran. Crucible buys out Remington's interest in Rem-Cru. Custom smelted copper remains dull

Nonferrous Metal Prices, Pages 156 & 157

TWO PROPOSED MERGERS and one acquisition have been announced by nonferrous companies.

Aluminum—Anaconda Co. has approved a plan to acquire the Cochran Foil Co. of Louisville. If Cochran stockholders vote to merge at their mid-December meeting, Anaconda will take over the nation's third largest producer of aluminum foil (Cochran's sales in 1956 were $22,201,000).

It would give Anaconda a fully integrated setup. The company would ship primary aluminum from its reduction facilities at Columbia Falls, Mont., to the American Brass Co. (an Anaconda subsidiary) fabricating plant at Terre Haute, Ind., where ingots would be rolled into coiled sheets. They would be sent to the Cochran Works in Louisville and processed into foil.

Molybdenum — American Metal Co. Ltd. and Climax Molybdenum Co. plan to pool resources and form a new company under the name American Metal Climax Inc. Major reason: To give both more diversification in metals.

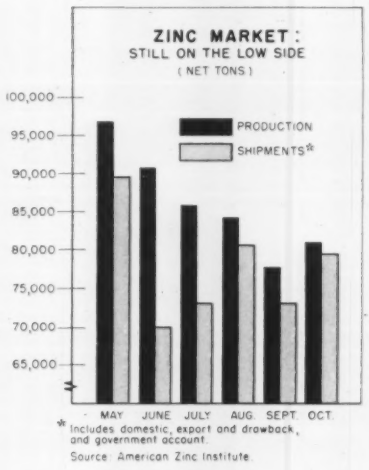
American Metal is in the production and sale of copper, lead, zinc, silver, and tin. Climax is the largest firm in the molybdenum field (350 million tons in ore reserves) and recovers substantial amounts of tungsten as a byproduct. The firm also owns uranium and vanadium mines and processing facilities, as well as oil and gas wells.

Titanium—Crucible Steel Co. of America has purchased full ownership of Rem-Cru Titanium Inc. It was owned by Crucible and Remington Arms Co.

Says Joel Hunter, Crucible's president: "It has become increasingly evident in recent months that the titanium business can best be conducted as a part of the specialty steel business."

Rem-Cru's production facilities are in Midland, Pa., adjacent to Crucible's Midland Works. The Rem-Cru plant produces titanium ingots, slabs, and billets.

Some metalmen wonder if the developments signal a trend in the nonferrous field.



Copper: Down to 25.5¢

Custom smelters who lowered their price a half cent to 25.5 cents a pound on Nov. 13 hoped the move would put a little pep into a generally anemic market. But major smelters say little improvement resulted.

Primary producers are having their troubles, too. Overproduction still plagues the industry. Latest statistics released by the Copper Institute show world refined production increased to 266,938 tons in October, the highest month since May. October deliveries to fabricators showed a gain, but it wasn't enough to keep pace with production. Result: Stocks rose 9000 tons.

Another of copper's problems, charge some sources, is an industry lag in promoting and developing products. Says Alvin A. Meyrowitz, vice president, H. Kramer & Co.: "The copper industry needs improved methods of marketing, increased promotion work, and basic research to meet the challenge presented by producers of substitute materials." Adds Austin Zender, president, Copper & Brass Research Association: "It is incumbent upon the copper producers and the brass mills to find new uses and to expand old ones if the industry is to maintain its position in the economy."

Tariff Hearings Start

The U. S. Tariff Commission began hearings on Nov. 19 to determine if duties on lead and zinc imports should be raised. It's rumored the lead and zinc industry wants a higher tariff and a quota on the amount of metal that can be imported. Chances are good the commission will rule for substantial hikes on imports of both metals, but it's not likely the industry will get everything it's asking for.

NONFERROUS PRICE RECORD

	Price Nov. 20	Last Change		Previous Price	Oct. Avg	Sept. Avg	Nov., 1956 Avg
Aluminum ..	26.00	Aug.	1, 1957	25.00	26.000	26.000	25.000
Copper	25.50–27.00	Nov.	13, 1957	26.00–27.00	26.361	26.469	35.956
Lead	13.30	Oct.	14, 1957	13.80	13.504	13.800	15.800
Magnesium .	35.25	Aug.	13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec.	6, 1956	64.50	74.000	74.000	64.500
Tin	89.125	Nov.	20, 1957	89.625	91.843	93.422	111.049
Zinc	10.00	July	1, 1957	10.50	10.000	10.000	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked: ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.

A welder caused us to caucus

The note from an employee suggestion box read "How come a company like this hasn't got the U. S. Savings Bond Payroll Savings Plan". It was signed by a welder in the fabricating department.

Since we actually *do* have Payroll Savings this told us two things: (1) Probably more employees than we imagined wanted the advantage of buying U. S. Bonds automatically through Payroll Savings. (2) We had grown lax in bringing our Plan to their attention.

But what to do? The solution was simplicity itself.

We called in our State Savings Bonds Director. He provided all the promotional materials needed to arouse interest in U. S. Savings Bonds. Then he helped to conduct a personal canvass and place an application blank in everyone's hands.

The results were amazing. Employee participation shot up to a percentage that we could take pride in. There was no "hard selling", nor was work interrupted. Our people wanted the security U. S. Savings Bonds offer them.

Today there are more Payroll savers than ever before in peacetime. Your State Director will be happy to help you install a Payroll Savings Plan or build enrollment in one already existing. Look him up in the phone book or write: Savings Bonds Division, U. S. Treasury Dept., Washington, D. C.

STEEL
The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTIC DONATION, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 31.30; No. 241, 31.50; No. 356, 29.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.50-26.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment data, f.o.b. shipping point.

Bismuth: $2.25 per ton, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $120 per lb, nom.

Copper: Electrolytic, 27.00 deld.; custom smelters, 25.50-26.00; lake, 27.00 deld.; fire refined, 26.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $80-110 nom. per troy oz.

Lead: Common, 13.30; chemical, 13.40; corroding, 13.40, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $227-230 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $80-100 per troy oz nom.

Palladium: $21-24 per troy oz.

Platinum: $81-87 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.50 per lb, commercial grade.

Silver: Open market, 90.375 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 89.125.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.50 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.10-4.20.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.75-30.25; No. 12 foundry alloy (No. 2 grade), 21.75-23.00; 5% silicon alloy, 0.60 Cu max., 25.50-26.00; 13 alloy, 0.60 Cu max., 25.50-26.00; 195 alloy, 24.75-26.75; 108 alloy, 22.25-23.00. Steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 23.75; grade 2, 22.00; grade 3, 20.75; grade 4, 19.00.

Brass Ingot: Red brass, No. 115, 27.25; tin bronze, No. 225, 36.00; No. 245, 30.75; high-leaded tin bronze, No. 305, 31.25; No. 1 yellow, No. 405, 22.75; manganese bronze, No. 421, 24.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.82, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 32.355; l.c.l., 32.98. Weatherproof, 30,000-lb lots, 33.66; l.c.l., 34.78. Magnet wire deld., 40.43, before quantity discounts.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $19.00 per cwt; pipe, full coils, $19.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 20.50; plates 19.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.00-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.136	43.10-47.60	.....
0.135-0.096	43.60-48.70	40.50-41.10
0.095-0.077	44.30-50.50	40.60-41.30
0.076-0.061	44.90-52.80	40.80-42.00
0.060-0.048	45.60-55.10	41.40-43.10
0.047-0.038	46.20-57.90	41.90-44.50
0.037-0.030	46.60-62.90	42.30-46.30
0.029-0.024	47.20-54.70	42.60-47.00
0.023-0.019	48.20-58.10	43.70-45.40
0.018-0.17	49.00-55.40	44.30-46.00
0.016-0.015	49.90-56.30	45.10-46.80
0.014	50.90	46.10-47.80
0.013-0.012	52.10	46.80
0.011	53.10	48.00
0.010-0.0095	54.60	49.40
0.009-0.0085	55.90	50.90
0.008-0.0075	57.50	52.10
0.007	59.00	53.60
0.006	60.60	55.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.70	47.50
5050-F	43.80	48.60
3004-F	44.80	50.50
5052-F	45.40	51.20
6061-T6	46.90	53.00
2024-T4*	50.60	57.40
7075-T6*	58.40	66.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	78.20	75.20	....	....
0.156-0.172	66.20	63.40	....	....
0.188	66.20	63.40	....	81.80
0.219-0.234	63.00	61.50	....	....
0.250-0.281	63.00	61.50	....	77.90
0.313	63.00	61.50	....	74.20
0.344	62.50	....	....	....
Cold-Finished				
0.375-0.547	62.50	61.30	74.80	69.80
0.563-0.688	62.50	61.30	71.10	65.50
0.719-1.000	61.00	59.70	64.90	61.70
1.063	61.00	59.70	....	59.60
1.125-1.500	58.60	57.40	62.80	59.60
Rolled				
1.563	57.00	55.70	....	....
1.625-2.000	56.30	54.90	....	57.50
2.125-2.500	54.80	53.40	....	....
2.563-3.375	53.20	51.70	....	....

Forging Stock: Round, Class 1, 45.20-58.60 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 50.50-66.60 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$19.40	2	$ 59.90
1	30.50	4	165.05
1¼	41.30	6	296.10
1½	49.40	8	445.55

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	60.60-64.80
12-14	45.70-47.20	61.30-65.80
15-17	45.90-47.90	62.50-67.50
18-20	46.50-48.30	64.50-70.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, .25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.) Aluminum: 1100 clippings, 13.50-14.00; old sheets, 10.50-11.00; borings and turnings, 6.50-

BRASS MILL PRICES

MILL PRODUCTS a — SCRAP ALLOWANCES f

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	50.13b	47.36c	....	50.32	23.000	23.000	22.250
Yellow Brass	44.02	32.30d	44.56	46.93	17.375	17.125	15.750
Low Brass, 80%	46.50	46.44	47.04	49.31	19.500	19.250	18.750
Red Brass, 85%	47.37	47.31	47.91	50.18	20.250	20.000	19.500
Com. Bronze, 90%	48.78	48.72	49.32	51.34	21.000	20.750	20.000
Manganese Bronze	52.01	46.11	56.61	....	16.125	15.875	15.375
Muntz Metal	46.39	42.20	....	....	16.375	16.125	15.625
Naval Brass	48.27	42.58	55.33	51.68	16.125	15.875	15.375
Silicon Bronze	54.76	53.95	54.80	56.74e	22.625	22.375	21.625
Nickel Silver, 10%	60.43	62.75	62.75	....	23.625	23.375	11.813
Phos. Bronze, A-5%	69.07	69.57	69.57	70.75	23.750	23.500	22.500

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices i n cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, or any or all kinds of scrap, add 1 cent per lb.

7.00; crankcases, 10.50-11.00; industrial castings, 10.50-11.00.

Copper and Brass: No. 1 heavy copper and wire, 19.25-19.75; No. 2 heavy copper and wire, 17.00-17.50; light copper, 14.75-15.25; No. 1 composition red brass, 16.00-16.50; No. 1 composition turnings, 15.50-16.00; new brass clippings, 13.50-14.00; light brass, 9.50-10.00; heavy yellow brass, 11.50-12.00; new brass rod ends, 12.50-13.00; auto radiators, unsweated, 12.00-12.50; cocks and faucets, 12.50-13.00; brass pipe, 13.00-13.50.

Lead: Heavy, 8.50-9.00; battery plates, 4.00-4.25; linotype and stereotype, 10.50-11.00; electrotype, 9.50-10.00; mixed babbitt, 10.50-11.00.

Monel: Clippings, 33.00-34.00; old sheets, 31.00-32.00; turnings, 23.00-24.00; rods, 33.00-34.00.

Nickel: Sheets and clips, 50.00-55.00; rolled anodes, 50.00-55.00; turnings, 45.00-50.00; rod ends, 50.00-55.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.50-17.50; 3003 clippings, 16.50-17.50; 6151 clippings, 16.00-17.50; 5052 clippings, 16.00-17.00; 2014 clippings, 15.50-17.00; 2017 clippings, 15.50-17.00; 2024 clippings, 15.50-17.00; mixed clippings, 15.00-16.00; old sheets, 13.50; old cast, 13.50; clean old cable (free of steel), 16.00-16.50; borings and turnings, 13.50-15.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 53.00; light scrap, 48.00; turnings and borings, 33.00.

Copper and Brass: No. 1 heavy copper and wire, 21.50; No. 2 heavy copper and wire, 19.75; light copper, 17.50; refinery brass (60% copper) per dry copper content, 19.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 21.50; No. 2 heavy copper and wire, 19.75; light copper, 18.50; No. 1 composition borings, 18.50; No. 1 composition solids, 19.00; heavy yellow brass solids, 13.00; yellow brass turnings, 12.00; radiators, 15.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 45.29; oval, 43.50, 5000-10,000 lb; electrodeposited, 35.75, 2000-5000 lb lots; cast, 36.25, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 107.50; 200-499 lb, 106.00; 500-999 lb, 105.50; 1000 lb or more, 105.00.

Zinc: Balls, 17.50; flat tops, 17.50; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.

Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30; f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 71.60; 300-900 lb, 69.60.

Copper Sulphate: 100-1900 lb, 14.55; 2000-5900 lb, 12.55; 6000-11,900 lb, 12.30; 12,000-22,900 lb, 12.05; 23,000 lb or more, 11.55.

Nickel Chloride: Less than 400 lb, 35.00; 400-9990 lb, 33.00; 10,000 lb, 32.50.

Nickel Sulphate: 5000-22,000 lb, 33.50; 23,000-35,900 lb, 33.00; 36,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.60; 200 lb, 25.99; 400 lb, 22.90; 1000 lb, 21.90; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 72.60; 100-600 lb, 63.80; 700-1900 lb, 61.10; 2000-9900 lb, 59.20; 10,000 lb or more, 57.90.

Stannous Chloride (anhydrous): Less than 25 lb, 161.60; 25 lb, 126.60; 100 lb, 111.60; 400 lb, 109.20; 5200-19,600 lb, 97.00; 20,000 lb or more, 84.80.

Stannous Sulphate: Less than 50 lb, 124.60; 50 lb, 94.60; 100-1900 lb, 92.60; 2000 lb or more, 90.60.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page* 151)

ered nominal. Mill operations are down, and with inventories heavy, large buyers are out of the market.

The export market is quiet, but it is hoped Japan will resume buying soon. Recent full cargo shipments to that country were against prior commitments.

The U. S. Engineer, Portland, Oreg., will receive bids Nov. 26 for approximately 296 gross tons of salvage steel and a quantity of copper wire resulting from the Fulton Canyon railway bridge relocation, and other operations.

Los Angeles—The scrap market is quiet, mill purchases being at a virtual standstill. Without export activity to cushion the depressed situation, the undertone is soft, and further price reductions are expected.

San Francisco—Scrap dealers here are concerned over the market outlook. Last week E. C. Barringer, executive vice president, Institute

CLASSIFIED ADVERTISING

STEEL PLANT ENGINEER

A graduate Mechanical Engineer is needed to fill a permanent position in our Plant Engineering Department at Fontana.

This opportunity is available for an outstanding engineer whose experience includes the design, maintenance, construction and layout of rolling mills and steel making facilities.

If your qualifications meet these requirements, send complete resume with salary requirements to

Employment Manager

KAISER STEEL CORP.

P. O. Box 217

Fontana, California

Available

HEAVY DUTY INDUSTRIAL SPACE

100,000 sq. ft.

ONE STORY

BRISTOL, PA.—near PHILA.

Will Divide

Penna. R.R. siding. Tailgate loading. 60′ bays. Cranes. Penna. Turnpike.

BINSWANGER

Leading the Nation in Industrial Real Estate

1420 WALNUT ST., PHILA. 2, PA. • PE 5-0202

New York • Charlotte, N. C. • White Hall, S. C.

FOR SALE — 1 Model 15 Bell Prime Mover, Serial #3433 complete with bucket and dual tires. Used very little and in excellent condition. Sale price $350.00.

THUNDER BAY MFG. CORP.
P. O. Box 317 Alpena, Michigan

WANTED MECHANICAL ENGINEER

Experienced in construction of roll forming equipment for the production of shapes and electric welded steel tubing. Our employees know of this ad.

Reply Box 621, STEEL
Penton Bldg. Cleveland 13, Ohio

WANTED

Used complete 100 pound steel capacity motor generator type Induction Melting Furnace.

Please contact R. D. V.
Niforge Engineered Castings, Inc.
677 Beacon Street Boston 15, Mass.

MELTER

Need melter with stainless steel background. Induction melting facilities 30 to 2000 lbs. capacity.
Excellent opportunity to grow with aggressive young company in suburban Milwaukee area.

Reply Box 622, STEEL
Penton Bldg. Cleveland 13, Ohio

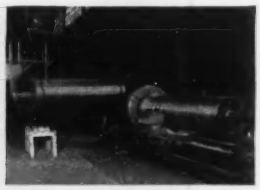
METALLURGICAL ENGINEERS

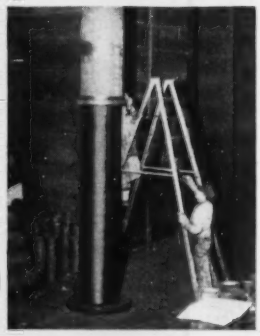
With experience in investigation and analysis of mechanical failures, shop methods, processes and devices employed in the manufacture of parts for heavy duty earth-moving equipment; and metallurgical and heat-treating studies to evaluate materials, chemical properties and heat-treating specifications based on analyses of service performance.

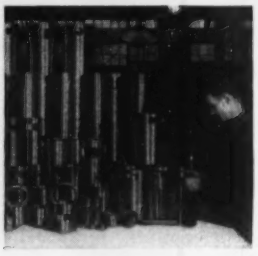
Direct replies to:

Personnel Director
THE EIMCO CORPORATION
P. O. Box 300
Salt Lake City 10, Utah

WE CAN HELP YOU TO CONTACT high calibre men to fill specific jobs you have in mind—
Readers of STEEL include men of wide training and experience in the various branches of the metalworking industry.
When you have an opportunity to offer, use the Help Wanted columns of STEEL.







You save 5 ways with

SHENANGO CENTRIFUGAL CASTINGS

By using Shenango centrifugal castings for essentially symmetrical parts, you will gain considerable savings because:

1. **The Shenango process automatically eliminates hidden defects in the metal . . . insures fewer rejects.**
2. **No patterns required . . . an important saving, particularly on special or small quantity runs.**
3. **Finer, more uniform grain structure means smoother, faster machining, better control, and a higher rate of completion.**
4. **With Shenango centrifugal method control, there's less excess metal to be machined away, less metal to buy and ship!**
5. **Because of their homogeneous, pressure-dense qualities, Shenango centrifugal castings are stronger, have better wear resistance and require less frequent replacement. Maintenance cost is cut!**

Check with Shenango on centrifugally cast parts for your needs —large or small castings . . . rough, semi-finished or precision-machined . . . ferrous or non-ferrous. They'll cost you less in the long run. For bulletins, write to: *Centrifugally Cast Products Division,* The Shenango Furnace Company, Dover, Ohio.

SHENANGO CENTRIFUGAL CASTINGS

COPPER, TIN, LEAD, ZINC BRONZES • ALUMINUM AND MANGANESE BRONZES
MONEL METAL • NI-RESIST • MEEHANITE METAL • ALLOY IRONS

of Scrap Iron & Steel Inc., told a local conference that the industry needs a more stable market through more systematic buying by consumers.

Marshall A. Shapiro, California Metals Co., San Francisco, emphasized the importance of exports to the West Coast industry. He said steel scrap prices on the coast have held above the national average because of a mild export revival. He said also that the steel mills will have to bring more stability into the market if they do not want to compete with exports.

Rails, Cars . . .

Track Material Prices, Page 142

Rail inquiry is light. Two hundred tons have been placed by the New York, New Haven & Hartford Railroad for flood reclamation. But that is all the tonnage that has been placed recently in the East, and none is reported on inquiry in the area.

Deliveries of new freight cars totaled 8295 in October, against 8450 in September, and 5666 in October, 1956. New orders last month amounted to 2206 cars, against 3257 in September, and 6532 in October a year ago.

The backlog of cars on order and undelivered as of Nov. 1 was 65,718. Comparisons: 71,981 a month eariler and 122,250 a year ago.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3350 tons, 10 state highway structures, including eight (composite I-beams) grade separations, one 358.1-ft composite welded girder, and one 294.7-ft composite beam and girder, interstate route connections, No. 250, Westchester County, N. Y., to Harris Structural Steel Co., New York; Merritt-Chapman & Scott Corp., New York, general contractor.

2000 tons, 21-story office building, 410 Park Ave., New York, to Simond Holland & Son Inc., Brooklyn, N. Y.; Kleban Construction Co., New York, general contractor.

1030 tons, Ferris Booth Hall, Columbia University, New York, to Central Structural Steel Co., New York; Lasker-Goldman Construction Co., New York, general contractor.

425 tons, warehouse, Liggett Drug Co., Stamford, Conn., to Bethlehem Fabricators Inc., Bethlehem, Pa.; Brown & Matthews Inc., New York, general contractor.

330 tons, two-span girder bridge, Greenwich, Conn., to City Iron Works, New Haven, Conn.; Palmer-Terinelli Construction Co., Bridgeport, Conn., general contractor.

275 tons, junior-senior high school, Cranston, R. I., to Providence Steel & Iron Co., Providence, R. I.; J. L. Marshall & Sons Inc., Pawtucket, R. I., general contractor.

130 tons, bridge, Glen Rock, Wyo., to Gate City Steel Works Inc., Omaha, Nebr.

35 tons, hangar addition, Boeing Air Field, Seattle, to Leckenby Structural Steel Co., Seattle.

Advertising Index

Abbey Etna Machine Co. 135
Acme Chain Corporation 16
Ajax Flexible Coupling Co., Inc. 150
American Brass Co., The 86
American MonoRail Co. 134
Armco Steel Corporation 56

Baldwin-Lima-Hamilton Corporation, Hamilton Division 43
Baldwin-Lima-Hamilton Corporation, Standard Steel Works Division 42
Basic, Inc. 55
Bethlehem Steel Co. 1, 160
Blaw-Knox Co., Foundry & Mill Machinery Division 49, 50
Bliss & Laughlin, Inc. 106
Bliss, E. W., Co., Mackintosh-Hemphill Division 85
Browning, Victor R., & Co., Inc. 150
Buffalo Forge Co. 138
Bullard Co., The 72

Carlson, G. O., Inc. 105
Cattie, Joseph P., & Brothers, Inc. 150
Chambersburg Engineering Co. 116
Chesapeake & Ohio Railway 18, 19
Cleveland Worm & Gear Co., The ..... Inside Back Cover
Colorado Fuel & Iron Corporation, The 108, 109, 115
Columbia-Geneva Steel Division, United States Steel Corporation 25
Copper & Brass Research Association 11
Copperweld Steel Co., Steel Division 75
Corhart Refractories Co., Inc. 126
Crucible Steel Company of America 36
Curtiss-Wright Corporation, Metals Processing Division 128
Cutler-Hammer, Inc. ..... Back Cover

Dempster Brothers 17
Detrex Chemical Industries, Inc. 12

Eimco Corporation, The 157
Electric Controller & Mfg. Co., The, A Division of The Square D Co. ..... Inside Front Cover
Erie Bolt & Nut Co. 133
Ex-Cell-O Corporation 6
Ex-Cell-O Corporation, Machinery Division 7

Federal Machine & Welder Co., The 24
Fellows Gear Shaper Co., The 68

Gardner Industrial Foundation 78
General Refractories Co. 107
Goodyear Tire & Rubber Co., Inc., The Industrial Products Division 4
Gulf Oil Corporation 46, 47

Hamilton Division, Baldwin-Lima-Hamilton Corporation 43
Heyl & Patterson, Inc. 13
Hooker Electrochemical Co. 41
Hyde Park Foundry & Machine Co. 159

Jessop Steel Co. 143
Jones & Laughlin Steel Corporation 121

Kaiser Steel Corporation 157
Keystone Steel & Wire Co. 125

Lincoln Electric Co., The 99
Lodge & Shipley Co., The 44, 45
Luria Brothers & Co., Inc. 153

McKay Machine Co., The 67
Mackintosh-Hemphill Division of E. W. Bliss Co. 85
May-Fran Engineering, Inc. 122, 123
Micromatic Hone Corporation 130, 131

National Acme Co., The 34, 35
National Steel Corporation 33
Niagara Machine & Tool Works 20, 21

Orban, Kurt, Co., Inc. 136

Philadelphia Department of Commerce, Industrial Development Division 102
Pioneer Engineering & Manufacturing Co., Inc. 10
Pittsburgh Engineering & Machine Co., Division of Pittsburgh Steel Foundry Corporation 101

Republic Steel Corporation 8, 9
Roebling's, John A., Sons Corporation, A Subsidiary of The Colorado Fuel & Iron Corporation 115
Ryerson, Joseph T., & Son, Inc. 58

Service Steel 150
Shenango Furnace Co., The, Centrifugally Cast Products Division 158
Simonds Abrasive Co. 3
SKF Industries, Inc. 2
Smith, A. O., Corporation 37, 38, 39, 40
Smith, A. O., Corporation, Welding Products Division 118, 119
Square D Co., The, The Electric Controller & Mfg. Co. Division ..... Inside Front Cover
Standard Conveyor Co. 23
Standard Oil Co. (Indiana) 83
Standard Pressed Steel Co., Flexloc Locknut Division 149
Standard Steel Works Division, Baldwin-Lima-Hamilton Corporation 42
Swaging Machine Division, The Torrington Co. 90

Tempil Corporation 79
Tennessee Coal & Iron Division, United States Steel Corporation 25
Texas Co., The 52
Thomas Flexible Coupling Co. 132
Thunder Bay Manufacturing Corporation 157
Timken Roller Bearing Co., The, Steel & Tube Division 76
Tinnerman Products, Inc. 80
Torrington Co., The, Swaging Machine Division 90

United States Steel Corporation, Subsidiaries 25, 26, 27, 28
United States Steel Export Co. 25
United States Steel Supply Division, United States Steel Corporation 25
Universal Atlas Cement Co. 28

Washburn Wire Co. 22
Washington Steel Corporation 48
Wean Equipment Corporation 89
Weirton Steel Co. 33
Westinghouse Electric Corporation 29, 30, 31, 32
Wheelabrator Corporation 144
Wheland Co., The 78
Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation 108, 109
Worthington Corporation 14, 15

Youngstown Sheet & Tube Co., The 51

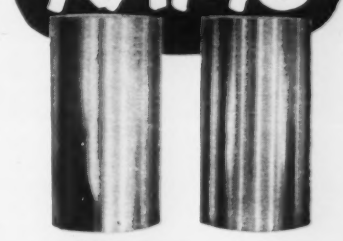
Zak Machine Works, Inc. 150

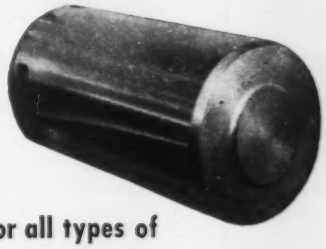
~ ~ ~

Table of Contents, Page 5

Classified Advertising, Page 157

Hyde Park RAMS





for all types of
HYDRAULIC EQUIPMENT

Hyde Park Rams are available in Chilled or Alloy Iron.

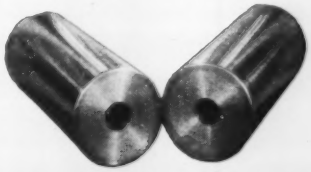
Furnished in hardness range to meet your specification ... ground to your required size.

On your next replacement of Rams — or for new equipment—consult us. Our engineers will be glad to assist you.

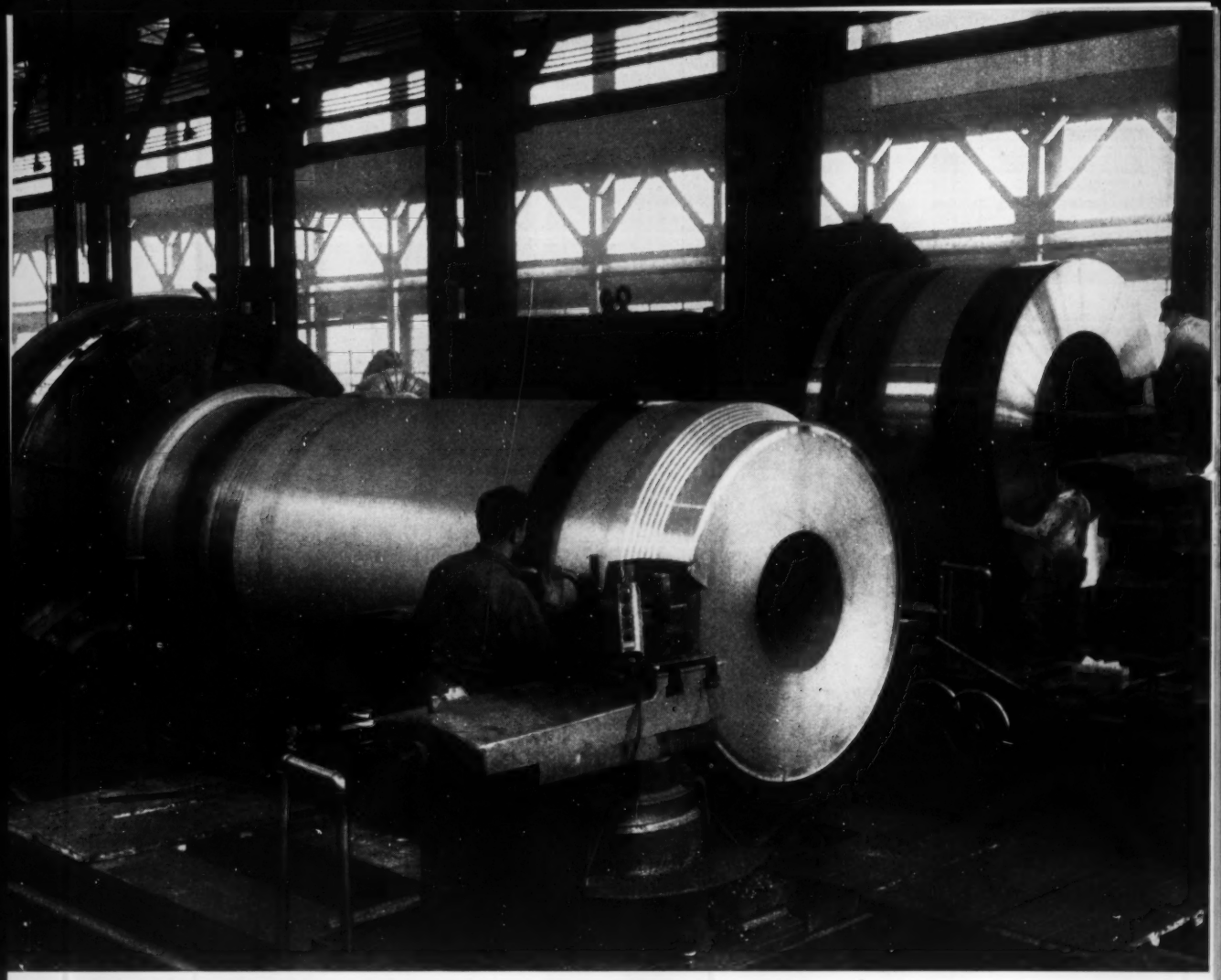
Red Circle Rolls for every Purpose

Rolling Mill Equipment

Gray Iron Castings up to 80,000 lb.



Hyde Park
FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland Co., Pa.
ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS



Here's where the Heavyweights Shape Up

This is the No. 8 Machine Shop of our Bethlehem, Pa., plant—a shop that has seen some of the world's heaviest forgings come and go. Here giant forged parts are machined to precise dimensions, checked and rechecked, groomed and pampered.

The two cylinders in the photograph are typical Bethlehem press forgings of the heavyweight class. The one in the foreground is the main cylinder for a 3500-ton extrusion press. It has an overall length of approximately 15 ft and an OD of 6 ft 1 in. It weighs 66 tons. Its squat neighbor in the background, shorter and several tons lighter, is intended for another type of press.

Forgings of this kind always take weeks to produce. The making of the steel, the forging, the heating and cooling, the slow, careful machining—all are steps demanding the highest technical skills.

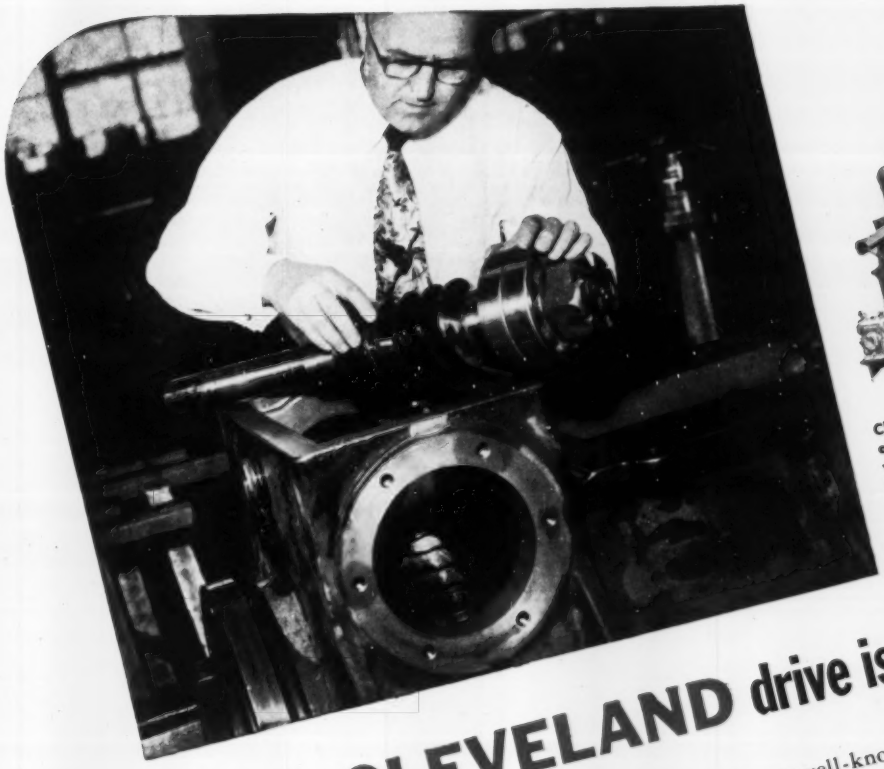
But not all Bethlehem skills are reserved for the making of heavy-tonnage items. Bethlehem shops produce every size and type of steel forging ever required—right down to the midgets weighing only a pound or so. When you are next in the market, by all means give us a call.

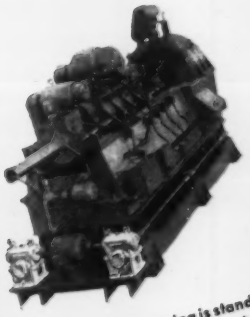
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL





Cleveland worm gearing is standard on these fully-automatic machines which thread oil field pipe to rigid A.P.I. specifications, ranging from 1¼" to 13⅜" O.D. In addition to worm gearing inside the machine, note two Cleveland Worm Gear Speed Reducers in foreground.

On job 18 years, CLEVELAND drive is good as new

AFTER 18 years of continuous service in a well-known pipe mill in Pennsylvania, a Stamets pipe threading machine had its first major overhaul. When the Cleveland worm gearing was removed from the machine it looked almost like new, showed only slight traces of wear. This unretouched photograph reveals the splendid condition of both the worm and gear. In fact, the gearing is in such fine shape that it was put right back in the machine—probably good for another 18 years of strenuous pipe threading.

This example is one of thousands of Cleveland worm gear drives, many made 25 and even 30 years ago that are still in service today. They serve in every phase of American industry, drive every type of mechanical equipment where a powerful, trouble-free, right-angle drive is wanted.

For full presentation of the many types and sizes of Cleveland worm-gear drives available, write for Catalog 400. The Cleveland Worm & Gear Co., 3270 E. 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication.
In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

Ahead with the leaders

For your *Security*...

Cutler-Hammer has pioneered the development of many vital electrical control components for aircraft. The dependable performance of this equipment in the best of today's military and commercial planes contributes directly to your security.

For your *Health*...

Dependable Cutler-Hammer Motor Control makes the modern water supply or sewage disposal plant a model of quiet efficiency and impressive cleanliness, a steadfast guardian of the public health.

For your *Comfort*...

Proper electric motor performance is the very heart of air conditioning and the leading manufacturers of such equipment, from small window-installed units to complete systems for huge buildings, use and recommend Cutler-Hammer Motor Control.

Electric motors and the control equipment which must direct and protect them have an astounding variety of jobs to do today. Modern aircraft and steel mills, for example, are poles apart in their needs. So are machine tools and air conditioning systems, sewage disposal plants and automobile assembly lines, oil well pumping and newspaper press drives. Each requires its own highly specialized control techniques and often control equipment just as highly specialized.

For sixty-five years Cutler-Hammer engineers have worked with the technical men of *all* industries on the specialized needs in motor control. In industry after industry they have been in the forefront of progress for decades, forever ahead with the leaders. It is logical that Cutler-Hammer Motor Control is so frequently the specified choice of both designers and users of specialized equipment where dependable performance is so important! And it is also most logical that you will find it pays to specify and insist on Cutler-Hammer whenever you order control.

Cutler-Hammer Three-Star Motor Control sets three new cost-cutting standards: installs easier, works better and lasts longer. Featured by leading machinery builders. Stocked for your convenience by your nearby Cutler-Hammer Distributor.

CUTLER-HAMMER
MOTOR CONTROL
C-H

, , , CUTLER-HAMMER, Inc., 1211 St. Paul Ave., Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto.